

CLEAN AIR

AND ENVIRONMENTAL PROTECTION

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- Southampton Commuter Plans for Local Air Quality Management
- Survey of Perceptions of Environmental Issues in Middlesbrough
- Reducing Noise in the European Community - Action Programme

Volume 26

Number One

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The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programme.

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EDITORIAL

Indicators For The Future

The Government report *Indicators of Sustainable Development for the United Kingdom* (HMSO, 1996) is welcome and important because it looks provocatively at information which is largely familiar.

The UK has an enviable record in documenting issues and initiatives in environmental protection and sustainable development. In 1990 *This Common Inheritance* described an environmental strategy for the UK in some detail. Five annual reports have followed. The latest, published in March, lists progress towards 642 policy and programme commitments. The 18th *Digest of Environmental Statistics* is imminent, and will continue to chart trends in environmental quality. The National Environmental Technology Centre and National Rivers Authority have provided air and water quality information in increasing detail. There is also a promise that NETCEN and the Environment Agency will provide electronic access to ever increasing amounts of data on the environment.

A wealth of high quality information is necessary to effect the transition to a more sustainable economy as rapidly and economically as possible, but it is not enough. Many potentially valuable initiatives have drowned in figures through failure or unwillingness to devote adequate attention to their interpretation. So far as possible, cause must be linked to effect, spurious correlations must be avoided, and interactions must be appreciated.

The 1994 *UK Strategy for Sustainable Development* went some way towards the necessary interpretation. However, at the time of its publication we expressed our disappointment at its unwillingness to fully evaluate the longer term consequences of lifestyle choices which appear to be unsustainable. The information in *Indicators* is chosen and arranged to illuminate the interactions between the economy, the environment and the 'actors' (that is, administrators, households and enterprises). Economic development is seen to place a pressure on the environment which alters its state in a way which requires a positive response if degradation is to be avoided and the transition towards a more sustainable pattern of development accelerated. As well as looking at interactions within familiar categories such as the economy, energy, fish stocks, air and waste, the document also considers qualitatively the significant interactions between them.

Indicators paints a national picture which is both fascinating and significant in its own right. We would all benefit from becoming more familiar with it, but there is a wider and in many ways more significant message. At all levels we should gauge the effects of our actions on the environment and respond appropriately. It is not sufficient to adopt and forget the policies which appear best fitted to the circumstances. We need to know promptly whether these policies are delivering the expectations which we had at the time of adoption, or leading to surprise in surprising places. When we know the effect of policies and plans we need to be prepared to respond, even if it requires collective courage. *Indicators* provides a valuable insight which will help us all to develop new senses of awareness and responsiveness. We hope that HM Government will set an example in the new culture.

SECRETARY GENERAL

NSCA is seeking a Secretary General to succeed Tom Crossett who is standing down towards the end of the year. The postholder is principal adviser to, and executive of, the Council of the Society.

He or she will be responsible to the Council for all aspects of the administration and development of the Society's policies and programmes.

This is a challenging position in a well respected and well established environmental organisation.

The Secretary General should have a good command of the Society's sphere of interest and achievement in it at a senior level. He or she will not only be a teamworker but also a versatile and effective manager who communicates well at all levels.

The post is permanent with a salary negotiable up to £28,000 (under review);
there is a non-contributory pension scheme after six months' service.

The closing date for applications is 24 May. Interviews will be held in Brighton on 27 June.

For further details please write to Tom Crossett, Secretary General,
National Society for Clean Air and Environmental Protection,
136 North Street, Brighton BN1 1RG.
Fax 01273 735802; Email cleanair@mistral.co.uk; Tel 01273 326313.

NSCA Training Seminar Traffic Management for Air Quality

-transportation control measures: what will work?

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Forthcoming air quality action plans will focus on tackling traffic pollution. This seminar will review the practical options available to local authority planners, traffic engineers, environmental policy officers and air quality managers as they start to agree an effective package of transportation control measures.

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NSCA NEWS

NOISE BILL

The Noise Bill (England and Wales only) introduced into Parliament in February creates a new offence of noise emitted from dwellings at night which exceeds a permitted level and provides for the noise-making equipment to be confiscated. Night is defined in the Bill as being from 11.00 pm to 7.00 am the following morning; the maximum level of noise which may be emitted will be determined by Directions from the Secretary of State - early consultations on the Bill had suggested 35 d(B)A but this is still under discussion. Where the local authority has served a warning notice which is ignored, the offender on conviction would be liable to a fine not exceeding £1,000; the Bill also enables the local authority to give a fixed penalty notice - currently set at £40.

It is proposed that, apart from the powers to confiscate noise-making equipment, the Bill should be adoptive - i.e. local authorities would have to resolve to adopt the new provisions for their area and publicise the proposed adoption.

Earlier this year NSCA carried out a "straw poll" of local authority officers in England and Wales to gauge their initial response to the proposals. The response rate was 60% (240 LAs). While the poll was carried out prior to publication of the Bill it showed that local authorities had very mixed feelings about it. The main results were:

- While 106 LAs said it was too early to say whether they would adopt the new powers, 85 said they were unlikely to adopt, and 49 likely to adopt.
- 102 LAs felt it too early to say whether they would make use of the fixed penalty offence, but 103 said they would be unlikely to make use of it; only 34 said they were likely to use it. Quite apart from the fact that many felt £40 was too low, it was also considered that enforcement could put LA officers at risk.
- The powers of confiscation found more favour among responding authorities with 181 saying they were likely to use (21 unlikely to use and 35 too early to say); however, again concerns for the safety of LA officers were raised and therefore, that this clause of the Bill should be amended to require a uniformed police officer to accompany the LA officer.
- Lack of staff/resources were considered by 169 LAs to be the major constraint on their ability to control noise nuisance; 34 cited lack of police cooperation and 49 lack of effective legislation; 29 LAs gave a variety of

reasons including risks to staff, delays in getting into court and no out-of-hours service.

NSCA prepared a briefing for the Committee stage of the Bill which included the results of its straw poll. The Committee stage was due to be completed by the end of March, to be followed by Report to the Commons before going to the Lords. NSCA will continue to monitor the Bill.

NEW NOISE CODE OF PRACTICE

NSCA's National Noise Committee has published a *Code of Practice for the Control of Noise from Oval Motor Racing Circuits*. The Code, which was drafted by John Gledhill of Tameside MBC and Alan Watson of Oldham MBC, is not intended to control noise from other types of motor racing.

The Code sets out to control noise in two ways: firstly, the control of noise from race cars and its attenuation by the fitting of silencers; secondly the Code addresses the control of noise from other sources, such as public address systems, noise from spectators and competitors entering and leaving the venue, etc.

NSCA is submitting the Code to the Department of Environment for approval by the Secretary of State under s.71 of the *Control of Pollution Act 1974*. NSCA will be circulating the Code to members of the Noise Forum and the various organisations representing motor racing covered by the Code who were involved in helping to draw it up. Copies of the Code are available from NSCA, price £25.00.

NSCA POLICY DOCUMENTS

Copies of the undermentioned responses to consultation documents and other work recently completed by NSCA are available from the Brighton Office. Please contact Sally May on 01273 326313; Email cleanair@mistral.co.uk.

- HMIP Guidance Notes, Series 2 (S2 5.01): Waste disposal and recycling - waste incineration (5.2.96).
- MAFF, Review of Crop Residues (Burning) Regulations 1993 (26.2.96).
- NSCA discussion paper: Should Britain Continue to Waste Municipal Waste (Byrom Lees) (8.2.96); currently being prepared for publication.
- NSCA National Noise Committee: Code of Practice on Oval Circuit Motor Racing (7.3.96); currently being prepared for publication.

REPORTS

Southampton Commuter Plans for Local Air Quality Management

Jonathan P. Francis BSc MCD
Economic Development Officer
Southampton City Council

Air pollution caused by road traffic congestion, particularly at peak times, is a problem in many towns and cities. This paper looks at how Southampton City Council and Hampshire County Council are tackling the problem by trying to change people's attitudes towards car use and make other forms of non-car commuting attractive.

Introduction

Southampton lies at the heart of one of the most prosperous regions in Britain. It is the single biggest industrial and commercial centre in the South East, outside London, with a thriving international port and business community. The current population is approximately 205,000 and over 100,000 people are employed in the city. At evening peak periods there are around 40,000 people moving out of the city centre, and approximately 300,000 vehicle trips two way are made each day using the city's radial routes; some degree of congestion occurs in certain places at peak periods. Air pollution caused by this road traffic and congestion is a problem in Southampton - as in many other towns and cities. In addition city congestion may encourage lorries to use unsuitable routes which take them through environmentally sensitive areas. The potential for further growth in car ownership remains considerable. This, combined with a number of major new developments planned for the city centre, means that the demand for road travel in Southampton has the potential to increase substantially, especially at peak times, with a consequent worsening of congestion and air pollution.

There is no realistic prospect of the supply of roads space in Southampton being increased to match forecast traffic demand. Quite apart from the fact that this would involve too much destruction of the urban fabric, government funding would probably not be available. Thus there is a need to manage or restrain this demand or, alternatively, accept the default situation of increasing 'restraint by congestion', which, though effective, is grossly inefficient and environmentally damaging.

The New Transport Approach

In the last few years transport policy at both national and local level has moved away from the traditional 'predict

and supply' approach, i.e. provision of increased roads space to meet the forecast increase in traffic demand, to a policy of maximising the efficiency of *existing* roads space through encouraging more space-efficient modes of transport than the private motor car, for example public transport and cycling. This reversal of policy has been precipitated by increasing concern at the impact of new roads, in terms of both land-take and subsequent air pollution, and a growing realisation that road provision actually generates additional traffic to fill it. It has also become clear that lead-free petrol, catalytic converters and the use of alternative fuels can only partly counter the adverse effects of transport on the environment.

The policy change is exemplified by the government's Planning Policy Guidance Note 13, *Transport*, issued in March 1994 to replace the old 1988 guidance (*Highways Considerations in Development Control*). The key aim of PPG 13 is to ensure that local authorities carry out their land-use policies and transport programmes in ways which help to reduce reliance on the private car. The Department of Transport will no longer fund road schemes which they see as contributing to an increase in commuter traffic; instead local authorities are required to submit 'package' bids for transport funding, containing measures to cater for a variety of different transport modes, based upon an integrated transport strategy.

In parallel with this, Hampshire County Council and Southampton City Council have developed a Transportation Strategy for Southampton; this aims to discourage unnecessary car journeys, and encourage public transport, cycling and walking. The strategy recognises that in order to change people's travel behaviour it is necessary to change their attitudes and at the same time introduce measures to make non-car alternatives more attractive. While it is unrealistic to expect changed attitudes alone to bring about

substantial alterations to people's travel behaviour, new attitudes are an important complement to improved public transport and cycling provision. Examples from Europe show that it is within the individual town or city that the link between better living, economic success and less traffic will be most readily understood and accepted.

Commuter Plans

One of the key elements in achieving the aims of Southampton's transport strategy is the discouragement of car-borne commuting, the control and management of which is considered to be particularly appropriate for several reasons:

- commuter traffic is responsible for the city's most serious traffic congestion;
- provision of sufficiently attractive alternatives to the motor vehicle is often more viable for commuters than for other road users, such as shoppers or freight vehicles;
- discouragement of commuter traffic does not have the same potential economic disadvantages as discouraging car-borne visits to the city centre by shoppers and other visitors.

One of the key ways in which commuting behaviour will be influenced in this way will be through the development of staff 'commuter plans' by large employers in Southampton: i.e. company strategies aimed at encouraging a reduction in car-borne commuting by their employees, by such means as reducing company benefits for the use of the car for travelling to work and the encouragement of alternatives. The development of staff commuter plans has been pioneered in America and in The Netherlands where they are now becoming widespread. The City Council has an important role to play in facilitating the implementation of commuter plans in collaboration with a wide range of private organisations and in acting on its own behalf as an employer. In particular the development of a commuter plan for the City Council itself could have an essential demonstration role in promotion of the concept to other employers. The main motivation for employers is likely to be a reduction in the costs and problems associated with car parking and an enhanced ability to attract workers through a package of 'green' transport initiatives.

To this end, the City Council has already undertaken the following measures:

- introduction of improved changing and storage facilities for cyclists, and an interest-free cycle loan scheme for Council employees;
- reduction in the number of free car parking spaces to staff who do not need to use a vehicle in the course of their everyday duties;
- establishment of a trial home-working scheme, together with accompanying guidelines.

The Journey-to-Work Study

As a preliminary measure in its Commuter Plan Project, in 1995 the Council undertook a comprehensive journey-to-work study of its staff and the relevant facilities and incentives available to them. The main purpose of this was to collect information to enable assessment of:

- existing journey-to-work patterns;
- the potential for switch of transport mode;
- the acceptability of certain changes aimed at reducing impact on the transport network.

As well as being an important precursor to the development of its own commuter plan, the Council considered it important that an employer conducted such research to establish a database of information which would be of use to other organisations.

The main source of data for the journey-to-work study came from a confidential questionnaire survey of all 2,350 City Council staff, which collected information to enable assessment of the three elements identified above. The questionnaire survey was also an important awareness raising exercise for staff, and a means of promoting a sense of 'ownership' amongst staff for any proposals developed. Nearly 1,200 valid returns were received, an overall response rate of 50%. The response rate for APT&C staff was much higher (69%), whereas the response from manual staff was comparatively low. All grades and groups of APT&C staff were proportionately represented, including women, ethnic minority groups and disabled people.

The other main elements of the journey-to-work study were a survey of the journey-to-work facilities and incentives available to Council staff, and an examination of the journey-to-work policies and practices amongst certain comparable employers.

The Study Results

The survey of Southampton City Council's journey-to-work facilities and incentives for its staff showed that they are still geared heavily towards car usage, despite the advances made:

- car parking is available to most Council staff at a cost below market rates;
- car ownership is facilitated through the lease car and car loan scheme;
- car usage on Council business is encouraged through the provision of car allowances and lease cars.

There is therefore scope to direct funding from support of car-based to other modes of transport.

The statistical analysis of the staff survey responses covered the many aspects of employees' journey-to-work habits and opinions. The analysis provides comprehensive information on employees' mode of travel to work,

influences upon modal choice, and opinions on alternative means of travel to work. The results showed clearly that the car is the dominant mode of transport for commuting by Council employees. Nearly 70% of respondents' journeys to work were by car, the large majority of which were by solo car drivers. In contrast, public transport accounted for only 17% of respondents' journeys to work, and cycling 5%. The strongest influence upon respondents' modal choice was time of journey followed by cost of journey/parking and the need of a vehicle for business use.

The statistical analysis also showed that there is widespread support amongst City Council employees, including car drivers, for public transport and cycling to be encouraged in order to reduce congestion and pollution; there is also a willingness on the part of many car drivers to switch mode if existing alternatives are encouraged, or additional means provided. This is illustrated in Tables 1 and 2.

The statistical analysis also revealed that discouragement of car-borne commuting is unlikely to result in commuters shopping less within Southampton, especially if provision is made for employees to drive in occasionally.

In addition to the statistical analysis, 531 City Council employees (45% of all respondents to staff survey) made further comments on the survey form concerning their journey-to-work habits and opinions. These responses cover all aspects of employees' commuting and provide comprehensive information on the reasons why employees travel to work in the way they do, and the measures that would be effective and acceptable in bringing about a reduction in their car use. A considerable number of respondents voiced specific concerns about environmental pollution, and made comments welcoming the survey, as the following quotes illustrate:

"In recent years, largely as a result of the fouling of the air by cars, I have contracted asthma, and I am thoroughly annoyed about this!"

"Southampton's air pollution has increased. I take a keen interest as I am an asthma sufferer and I know that a lot of my problems are caused by having to come into work in the centre of Southampton."

"As I have long been concerned about the damage caused to the City and the environment in general by excessive car use, I was heartened to see the City Council taking positive steps on this issue."

Table 1: Respondents' views on priority to be given to alternative travel modes

<i>Means of Travel</i>	<i>Low Priority</i>	<i>Medium Priority</i>	<i>High Priority</i>
Public transport			
facilities/incentives (e.g. park & ride)	9%	23%	68%
Cyclist			
facilities/incentives	20%	31%	49%
Car user			
facilities/incentives (e.g. parking, lease car)	27%	27%	46%

Table 2: Car commuter views on alternative means of travel to work

<i>Means of Travel</i>	<i>Would use rarely</i>	<i>Would use sometimes</i>	<i>Would use often</i>
Car-sharing scheme with parking incentives	45%	27%	28%
Park and ride	58%	26%	16%
Minibus service to home	42%	24%	34%
Bus/train, if passes available at discount or on interest-free loan	47%	21%	32%
Bicycle, if facilities improved	66%	17%	17%

"I support the principle of integrating Council policy on employee transport with environmental policy."

From analysis of the comments it was concluded that alternative modes of transport into Southampton need to be provided or encouraged, if the volume of car-borne commuting by Council staff is to be reduced. In addition, there is support amongst Council employees for less priority to be given to car user facilities and incentives, and for resources to be switched to providing and encouraging 'greener' forms of transport. However, employees believed that provision should be maintained for those staff who need frequent access to a car for Council business, and that such staff should receive priority in the allocation of car user facilities and incentives.

From the survey analysis as a whole it was concluded that the Council should introduce a package of measures in order to address the range of reasons why employees commute by car, and to allow for the fact that different modes of transport are suitable for different people. The analysis indicated that this would have the effect of reducing the level of car-borne commuting by Council employees.

Conclusion

The work carried out to date on this project has yielded a mass of valuable information about journey-to-work patterns of City Council staff, and their attitudes to switching to modes of transport that cause less environmental damage and reduce pressure on the highway network. From the study it was possible to identify the main possible areas of action for the development of the Council's staff commuter plan, including the following:

changes to employee car parking provision and travel allowances; pool cars; review of lease car scheme; Council minibus; crèche facilities; park & ride service(s) for Council employees; car-share register and incentives; enhanced cyclist facilities; investigation of more flexible ways of structuring working hours; the development and promotion of a Council 'green' journey-to-work ethos.

Some of the measures identified, particularly park & ride services and a car-share register, afford considerable potential for collaboration with other large employers in Southampton.

The study results were reported to Southampton City Council's Strategy and Development Committee in December 1995, and approval was given for officers to move forward in preparing a commuter plan for the City Council. The study report is a good basis for the commuter plan, containing as it does the main measures, and providing guidance on how they can be implemented. There is now a need to refine the measures into precise proposals, which will:

- be acceptable to staff;
- be effective in achieving modal shift;
- cater for people's need to travel on work business;
- be affordable.

For this purpose staff focus/discussion groups will be used which will be invaluable in deciding how to implement the ideas contained within the report. The outcome of this next stage should be a draft commuter plan to put to Members in the Autumn; this should set out a tangible project including costs and outcomes.

In addition, the Council will continue to work with other major employers within Southampton to encourage the development of commuter plans amongst other organisations. As well as affording the potential for a greater cumulative impact in terms of the number of people targeted, liaison with other major employers also affords the possibility of introducing journey-to-work initiatives in partnership to achieve economies of scale, and of sharing ideas and experience.

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A Survey Investigation of Perceptions of Environmental Issues in Middlesbrough

Dr. H. F. Gavin
University of Teeside

A survey of Middlesbrough residents was carried out by Middlesbrough Borough Council concerning awareness of, and attitudes to, environmental issues. This paper discusses the findings of this survey and the implications. Recommendations for further study are also made.

1. Introduction

The concept of stewardship over nature is an old one. As we examine the development of this attitude we can see shifts through imperialism (in the writings of Bacon), romanticism (Thomas, 1983) and utilitarianism (John Stuart Mill, 1806-73) as expressions of human relationship with nature. In latter years, however, a new perspective has grown from former attitudes - environmentalism. Essentially and uniquely a departure from previous perspectives, the view of environmentalism has moved from the 'fringe' movement of the 60s and 70s (when Greenpeace was confused in the public mind with the Flat Earth Society) to a position where very few people in the UK will not have heard of the Rainbow Warrior.

Concern for the environment is now firmly established in the mind of the public and each successive generation of school children appears more aware, and more vociferous than the last in terms of such issues. But, however much we observe the changes around us, it is still difficult to determine what impact such ideas have upon the individual. What is the awareness and attitude of the ordinary citizen? Simmons et al (1992) found that adults judge a clean environment as important as equality and world peace, and related in importance to freedom and health. Fitchen (1989) also found that public reaction to toxic contamination was not only that it is seen as a health risk and potential cause of financial loss, but also an attack on the cultural values of home and home ownership. Agencies who may be seen as sources of potential problems ignore public attitudes at their cost, as political changes often ensue from changes in public demand. Even if it can be shown that the risk associated with a particular agency's activities is small, if the communication channels used to convey this are not credible, the communication's objectives will fail (McCallum et al, 1991). Indeed, there will be a tendency to think the agency has something to hide!

The first step in determining the public attitude, and any inaccuracies that need to be rectified, is to ask. Middlesbrough Borough Council carried out a small-scale survey with the intention of determining attitude and perceptions of residents. The author was commissioned to carry out the analysis of data gathered this way. This paper

describes that survey and its findings, with particular regard to air quality.

2. Method

In order to reach the sample of households most effectively, a postal questionnaire was devised covering the areas of air quality, noise pollution, recycling, energy usage and transport. It was sent to 500 households in 27 wards. Three hundred and four were returned, a response rate of approximately 60.8%. The responses to each questionnaire were coded and placed in a data file for use in SPSS for Windows Version 6 by staff of Middlesbrough Borough Council Public Protection Department. The analysis was carried out by the author of this paper. Where appropriate, some respondents were excluded from the analysis of some questions; in particular respondents who left a question blank have not been included in the proportion of responses to many questions and in some cases those responding *don't know* have also been excluded.

2.1 Respondent Characteristics

In 304 returned forms, 151 respondents were male, 150 female with 3 declining to respond. The majority of respondents (59.5%) were aged between 31 and 65. The majority of households in which the respondent lived had between 2 and 4 people resident in them (74%). There was relatively even spread of employment categories throughout the sample. 81.2% of the sample had lived in the Middlesbrough area for more than 20 years. A large proportion of this group (59% of those living in Middlesbrough over 20 years) are, of course, in the older age categories (46 and over).

2.2 Analysis

It was decided that this was an adequate sample, but the detailed analysis was to be performed on a set of responses that were clustered geographically. Certain types of statistical procedures cannot be performed if the sample, and its components, are too small. Accordingly the 27 wards were clustered into four (N/S/E/W) locations, and these were the units of examination. The Eastern and Northern clusters are closer to local industry, and are the more densely populated.

The major method of analysis used has been cross tabulation, but in some instances it has been possible to use the chi-squared procedure. This demonstrates the strength of association between two or three variables, by comparing the numbers observed in the survey with the frequencies statistically expected: i.e. is there a different number of males and females answering in a particular way, and is this a different proportion than would be expected given the make up of the sample? (See Bryman & Cramer, 1995, for a fuller explanation.)

The analysis is reported by question, with cross referencing to various characteristics. Only those analyses giving results of particular relevance or significance are discussed here.

3. Results

The questionnaire is divided into several sections in addition to general questions about the respondent and his/her household. This paper concentrates on the questions related to air quality, and general environmental awareness.

3.1 Perception of Environmental Issues

This section asks respondents about their views on what are the important issues in Middlesbrough, what changes should be made and who should make them.

The three most important issues, in terms of frequency of response, were air quality, litter and industrial air pollution.

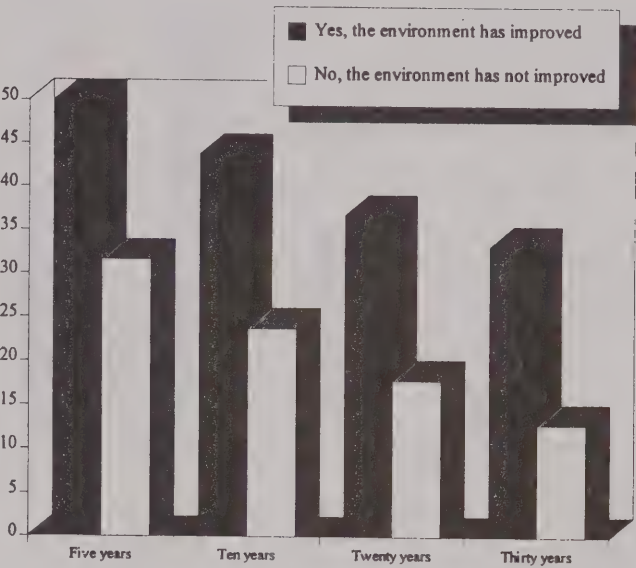
The most frequently cited change desired was *less litter*, with *less air pollution* and *punish owners of dogs fouling* almost as popular. When asked who should initiate these changes, a large proportion (63.5% of those responding) suggested that the *local council* should be responsible. When asked what local residents could do to protect the environment, respondents answered *be more environmentally aware*, with *tidy gardens* also being a frequent response. Asking the same about local business/industry the most frequent response was *less air pollution* with *disposal of waste* also being frequently cited.

Respondents were asked the same question of the local council and, finally of central government. Of those responding 72% thought the council should use stronger laws or develop long term strategies, 46.1% thought that the government should provide more money to deal with these issues, with 17.2% responding *enforce the law better*.

Respondents were asked whether they thought the local environment had improved over the last 5, 10, 20 and 30 years. These responses are obviously affected by the length of residency, but this is taken into account by calculating the proportion of positive responses in terms of overall response to that portion of the question, excluding 'don't know'. The proportion of respondents responding 'yes' or 'no' to the question *do you think the quality of the local*

environment is better than it was:- a) 5; b) 10; c) 20; d) 30 years ago? is shown in figure 1.

Figure 1: Perceived Improvement Over Time (see text)



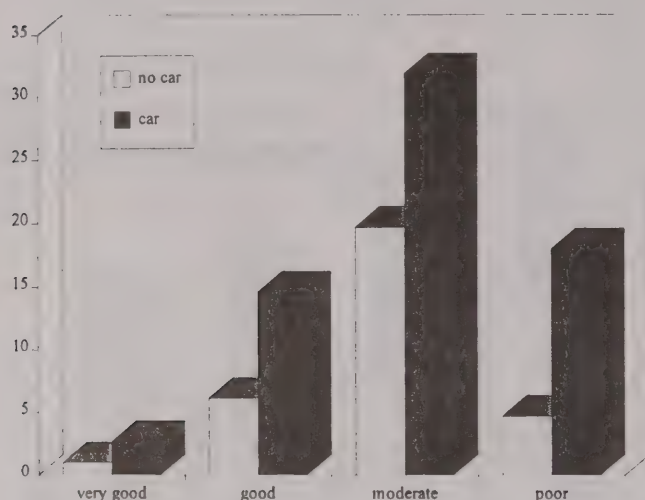
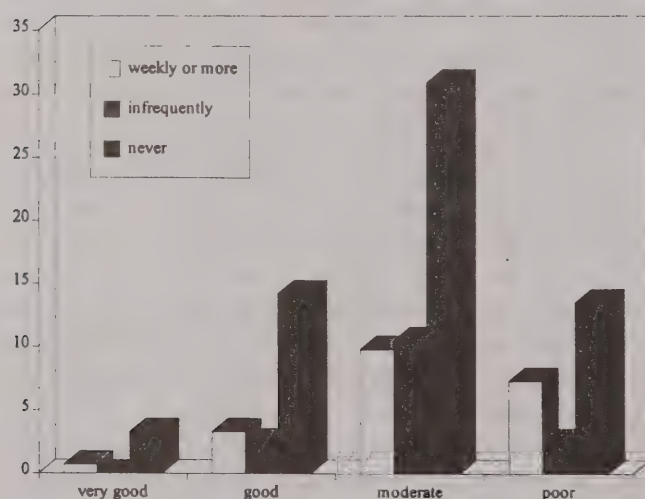
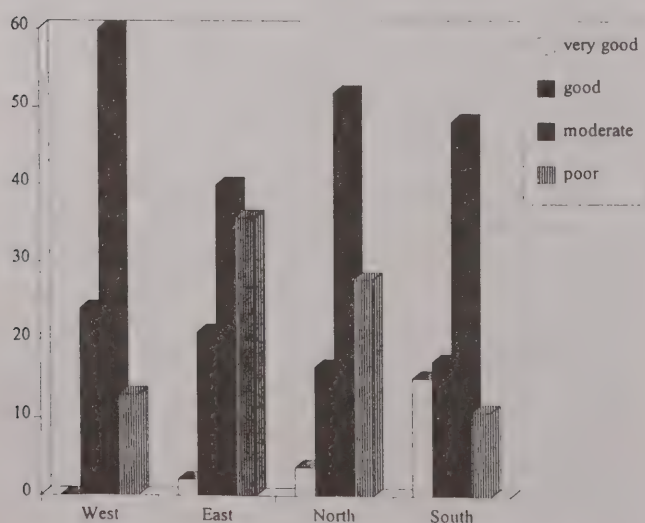
3.2 Perception of Air Quality

This section asks respondents about air quality, their experience of air pollution and their opinions on its source(s) and what should be done to improve quality.

72.3% of the sample rated the air quality *moderate* or *poor*. There is no difference in rating of air quality linked to gender. There is, however, a significant link between car ownership and response to this question (see figure 2). 67.5% of the sample own at least one car, and those respondents appear more likely to rate the air quality as better than those who have no car (chi-squared = 10.003, df = 4, p<0.05). When comparing this to cycle usage, 62.9% never use a cycle, with a further 15.6% rarely using one. Whilst there is no significant association between this and rating of air quality, the tabulation indicated that there may be a trend towards better ratings if people do not use a cycle.

There is a significant association between geographic location and rating too (chi-squared = 44.121, df = 9, p<0.05). As can be seen in figure 4, people living in the Eastern cluster appear much more likely to give a rating of poor, with a large proportion of those in the West giving a moderate to good rating.

When examining these characteristics with respect to geographic location, it can be seen that there is a significant link between car ownership and rating in the Western cluster that is not seen in the other areas (chi-squared = 8.42, df = 2, p<0.05); 3.44% of non-car owners give a rating of poor, but 16.9% of car owners give this rating. This is contradictory to the findings when the sample is considered as a whole, but demonstrates that the ratings in the other clusters are more evenly distributed, as there was no rating of very good in the West.

Figure 2: Distribution of Car Ownership by Rating of Air Quality**Figure 3: Cycle Usage and Rating of Air Quality****Figure 4: Geographic Location and Rating of Air Quality**

Respondents were asked why they had given this view. In general a larger proportion (39.13%) stated that industrial smells were the reason they gave moderate to poor ratings. The responses were evenly distributed across gender and job category. However a disproportionate number of non-car owners (18% as opposed to 6.8% of car owners) stated that a link to asthma was a reason for giving poor ratings. Whilst this is not statistically significant, it is a point to note. It is not however mirrored in the cycle users' responses.

Respondents were then asked which of three choices they thought was the source of (air) pollution.

- 68.2% of the sample think that traffic is the major source of pollution. Examining this in terms of location, although statistically the link is not significant, there does seem to be a larger proportion of people in the South and West who regard traffic as a problem (76% and 74% respectively) compared to the North and East (63% in both).
- 84.4% of respondents thought that industry was a major source of pollution. There are slightly more people who own cars, and who state industry is a major source, than would be expected, although this finding falls slightly short of statistical significance (chi-squared = 3.443, degrees of freedom - 1, $p = 0.06$).
- 69.2% of the sample stated that domestic or commercial sources are linked to air pollution.

When asked if they would like the council to issue daily air quality bulletins, 64.7% of the sample wanted to see bulletins of this nature. There was a slight difference of opinion between males (60.14%) and females (69.34%). There is a significant link between car ownership (chi-squared = 10.61, $df = 1$, $p < 0.05$). A high proportion of those with cars (77.9%) do not wish to see bulletins, and 71.9% of those without do want to see them. Breaking down this question's response by location suggests that the significant differences in wishing to see bulletins between car owners and non-owners lies in the South of the region. However, the numbers of respondents concerned is too small to make any inferences from the statistical findings.

A large proportion of the sample who wish to see bulletins think they should be on TV (51.72%), with 50.57% stating a local paper, and 39.66% stating local radio. However, when asked if they had seen such bulletins, the respondents' answers tell us that the current communication mode might not be too fruitful. 92.4% of the respondents had not seen bulletins or were not sure they had seen them.

46.44% thought action could be taken by local people to improve air quality. There is a definite link with car ownership (chi-squared = 23.42, $df = 3$, $p < 0.05$) with a larger number of car owners responding yes; it also appears that car owners in the West are more likely to say there is

action that could be taken. Those in the professional and managerial categories were more likely to state that action could be taken, but with a large number of categories, and few responses in each category, no significance can be attached to this result.

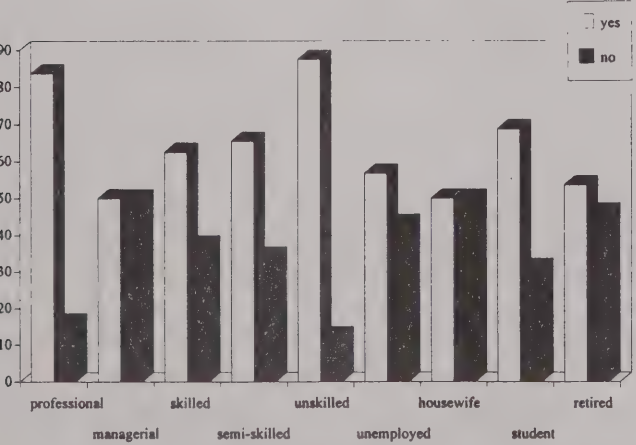
When asked to give examples of action, 35.51% suggested reducing car usage, with 56.96% of these being car owners. Also 19.84% suggest cleaner vehicle fuels, with 76.34% of these being car owners.

Turning to experience of air pollution, 58.3% of the sample claimed to have experienced unpleasant air pollution in the previous six months. There was a significantly disproportionate distribution across job categories of stating experience (chi-squared = 35.84, df = 8, $p < 0.05$) - see figure 5 for a display of these proportions. Also those living in the West and East are more likely to have answered question 11 or parts of it.

The most frequent level of experiencing the pollution was *only once or twice* indicating that pollution is not experienced very frequently (42.7% of course had not experienced air pollution). Respondents were most likely to state that the pollution had lasted *up to half a day*. Asked to describe it, the most frequently experienced pollution was a foul or nasty smell (39.2%). However the experienced pollution does not appear to be causing much damage, the most frequent response to this question was *no*, but 15% had experienced staining of clothes or paintwork.

The *pollution* may not be damaging anything, but the respondents know who to blame. Combining the response relating to specific companies and industry in general, 71.7% of the sample think that the pollution came from industry.

Figure 5: Recent Experience of Air Pollution and Job Category



5. Discussion

It is clear that residents are concerned about their environment, but that they may have erroneous views on who is to blame for perceived problems. Furthermore, they are very sure about who is responsible for dealing with it, and it isn't themselves.

Respondents tended to rate air quality as poor to moderate. However, the official banding of *moderate* may mean different things to experts and citizens. There is also some evidence to suggest that rating of air quality is linked to proximity to industry, but that this is not necessarily related to experience of air pollution. The major factor that seems to affect rating is car ownership. It is possible that those who do not travel regularly by car are more likely to experience fluctuations in air quality, particularly when they are associated with unpleasant smells. However, one person's poor air quality might be another's blue sky on a sunny day, with factors such as asthma, hay fever and sense of smell all playing their part. In such a small and relatively uninformed sample, it is difficult to make clear statements, as individual differences are not possible to remove statistically.

The findings are supportive of the general research in this area. Weinstein & Sandman (1992) suggested that hazards that are not possible to perceive directly are not rated as a problem even when information is given. For example, Dunlap et al (1993) discovered that only specific groups are concerned with depletion of the ozone layer, despite large amounts of general information about this. The current study bears this out in that respondents are concerned with those items they can smell, which are probably not the most hazardous anyway. Such tendencies have an effect in terms of funding, as resources are directed towards items identified as hazardous by the public, and not by experts (Stevens, 1991).

In summary then, this small scale survey has determined the level of awareness and experience of pollution in a portion of Middlesbrough's population. Whilst they claim to be concerned, they do not appear to know what they can do about their environment, and are prepared to leave it in the hands of policy makers and those they blame for the problems. In all, experience of pollution is not too bad, and appears to be from items that are not hazardous.

Recommendations for Further Study

This survey has been thoroughly carried out on a small proportion of the population of Middlesbrough. The response rate has been high for a postal survey - typical response rates fall into the region of 20-40% (Frankfort-Nachmias and Nachmias, 1992) and can be as low as 5%. The high response rate may be due to the small reward offered (an energy-saving light bulb), as inducement does raise participation (Fowler, 1989). However, the relatively small scale of this survey means it should be regarded as a preliminary study. Although based on a probability sample, with the sampling frame being the electoral register, the representativeness of a sample of below 1% cannot be guaranteed. Therefore these analyses should be regarded as indicating areas for further research. It is clear that a larger survey of this nature would require a large input of

resources. The questionnaire could be refined, but would still require administration to higher numbers than is practical at the present time. An alternative to this would be to select questions for further in-depth examination via interview with small groups of residents. There are various items which appear to warrant further investigation in both the air quality section, and in the other sections of the questionnaire, possibly as both cross-sectional and longitudinal studies.

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Action Programme to Reduce Noise in the European Community

Ian Clark

Directorate General for the Environment (DGXI)

The European Commission

As complaints from the public about noise continue to increase, there is now welcome evidence that the need for legislative and other measures to control noise are rising up international and national agendas. In the UK a new Noise Bill will enable local authorities to make excessive night-time noise a criminal offence and to confiscate noisemaking equipment - see page 5 of this Clean Air. On 15 February NSCA organised a training seminar at the NEC Birmingham which brought participants up to date with policy developments at both UK and European level; this paper is a summary of Ian Clark's presentation which outlined EC developments in noise control policy.

Many Europeans consider environmental noise, caused by traffic, industrial and recreational activities, as their main local environmental problem, especially in urban areas. Indeed noise is considered to be the most "urban" of all environmental problems. It has been estimated that more than 20% of inhabitants in western Europe suffer from noise levels that scientists and health experts consider to be unacceptable - levels at which most people become annoyed, sleep is seriously disturbed and even adverse effects on the cardiovascular and psychophysiological systems are to be feared. The increasing number of complaints from the public about noise, especially since the mid 1980s is evidence of the growing concern of citizens. A number of recent international publications on the problem - such as those by WHO, EEA and the Nordic Council show that greater attention is being paid to noise issues at international level.

European Community measures to address environmental noise problems have been in existence for over 25 years; these have essentially consisted of legislation fixing maximum sound levels for vehicles, aeroplanes and machines with single market aims and, as such, have not been conceived as part of an overall environmental noise abatement programme. Member States have enacted a multitude of supplementary regulations and other measures aiming to reduce environmental noise problems and although there is some evidence to show that noise levels in the worst "blackspots" have been reduced, recent data show that the overall noise problem is worsening and the number of people living in so-called "grey areas" has increased. In particular, part of the problem can be attributed to the continuing growth in traffic volume in all modes coupled with suburban development resulting in high levels of noise exposure being spread ever wider over both space and time. In addition over the past two decades leisure activities and tourism have created new spots and new sources of noise. As a result of these developments the impact of the policy measures implemented to date to address the noise problem are being offset. Available data on the current state and forecasts of the noise environment (which have serious

shortcomings) show that in the absence of ambitious abatement policies, the noise environment risks remaining unsatisfactory or even deteriorating (EEA).

Generally action by the Community and the Member States on environmental noise has had a lower priority than that taken to solve other problems such as air and water pollution. As far as the Community is concerned, in part this has been due to the fact that noise is very much a local problem with very varied perceptions in different parts of the Community as to the acceptability of the problem. However, despite the local dimension to environmental noise problems, there is a general international consensus on the levels of unacceptable noise to which the public should not be exposed in order to protect health and the quality of life. In 1993, the European Community announced a change to its approach to environmental noise abatement and in the Fifth Environmental Action Programme established as a basic objective the situation where no person should be exposed to noise levels which endanger health and quality of life. The Programme puts forward a strategic framework for environmental noise based on a number of targets for noise exposure levels to be reached by the year 2000.

Targets up to the year 2000 (in Leq dB(A)) are to phase out night-time exposure of 65 dB(A) and to ensure that at no point in time a level of 85 dB(A) should be exceeded; in addition the aim is to ensure that the proportions of the population exposed to night-time levels between 55 and 65 dB(A) should not increase. Special attention is required in quiet areas, whose exposure should not increase beyond 55 dB(A).

In order to meet these targets and improve the coherence of the Community's approach to noise reduction a package of measures is proposed for implementation by the different actors depending on their responsibilities and competences, covering information, technological, planning, economic and educational issues. There is a clear recognition, as in other areas of environmental policy, that the Community needs to broaden the range of instruments to be applied rather than relying solely on legislation of

emissions at source if progress is to be made in protecting people from increasing noise exposure.

The actions include

- improvement of the information and data available on the noise situation;
- the standardisation of noise measurement and ratings;
- the establishment of noise abatement programmes;
- further reductions in emission limits on vehicles and machines through Community legislation;
- measures to influence behaviour and related to infrastructure and physical planning.

Following on from the framework established in the Fifth Programme, the Commission is preparing a Communication in order to translate the basic principles and list of actions into a medium term action programme for environmental noise abatement. In line with the subsidiarity principle and shared responsibility, it comprises measures to be taken at Community, national and local level, as well as by businesses and the public.

The Communication will include:

- some basic information on the problem of environmental noise and its effects, followed by a brief review of the noise situation in the Community;

- estimates of external costs to society of noise pollution based on rather incomplete data;
- analyses of the impact of Community and Member State noise abatement measures taken to date;
- the improvement of information for the public and its comparability;
- a "package" of measures for noise abatement based on the costs and benefits of different actions including a definition of tasks for the different actors.

→ A Resource Pack of available papers and/or abstracts presented at the Noise Update Seminar may be obtained from NSCA, price £20 inclusive of p & p.

→ 24 April 1996 was the first International Noise Awareness Day; NSCA (with funding from the DOE) coordinated activities in the UK - a report will appear in the summer edition of *Clean Air*.

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The 1996 edition has been substantially rewritten to include the provisions of the 1995 Environment Act (including the Environment Agency and SEPA, Air Quality Management, National Waste Strategy, and Contaminated Land) alongside the usual chapters covering integrated pollution control, air pollution, waste, noise and water.

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UPDATE

EMISSIONS MONITORING

Draft Regulations (to be made under the *Environment Act 1995*) are to be introduced enabling trained local authority officers to check a vehicle's emissions at the roadside - powers to stop vehicles will remain with the police. Motorists and operators whose vehicles fail the test will face a fixed penalty charge and will have to have their vehicles retested to show that emissions are within acceptable limits.

Local authorities are also to be given powers to penalise drivers of parked vehicles who leave their engines running unnecessarily; the Regulations will take account of the need to keep engines running to power, for example, air conditioning in coaches and refrigeration plant in commercial vehicles.

These measures will form one of the tools at the disposal of local authorities enabling them to meet the air quality standards and targets set in the forthcoming National Air Quality Strategy

LOCAL AIR QUALITY MANAGEMENT

Over 80 local authorities in Great Britain are to participate in pilot local air quality management programmes in advance of the relevant sections of Part IV of the *Environment Act 1995* coming into force on 1 April 1997. Then all local authorities in England, Wales and Scotland will be required to conduct regular reviews of air quality in their area. Where all or part of it does not meet standards or objectives, the local authority must designate an air quality management area and prepare a remedial action plan.

The results of the pilot programme will ensure that appropriate procedures, good practice and guidance is developed in advance of full implementation. The Government has allocated £2 million for special grant payments to help authorities; further authorities may be invited to join the pilot phase depending on funds being available. The Department of the Environment is putting together a package to help all local authorities prepare for their new air quality duties.

In addition to all London Boroughs, other authorities taking part in the pilot programme are:

- Cambridge county & city councils with S. Cambridgeshire DC;
- Hampshire county & district councils;
- Cornwall county & district councils, acting under the Cornwall air quality forum;

- the new unitary authorities of the former county of Avon;
- the metropolitan authorities of the W. Midlands;
- the NE Derbyshire Air Quality Management Group (district councils of NE Derbyshire, Bolsover & Chesterfield with Derbyshire Dales DC and High Peak BC);
- Ribble Valley BC;
- the metropolitan authorities of the Merseyside conurbation;
- Barnsley, Doncaster & Rotherham metropolitan authorities;
- Tyne & Wear Air Quality Management Group (metropolitan authorities of Tyne & Wear);
- City of Glasgow;
- City of Aberdeen;
- the new unitary authorities of Neath & Port Talbot & Swansea.

EPA PART I AUTHORISATIONS & IPPC

In a written answer to a Parliamentary question from Joan Ruddock MP, Environment Minister James Clappison said that as at 12 February 1996 there were 1,863 authorised Part A processes; a further 246 applications for authorisation had yet to be determined.

As at 31 March 1994, 10,535 were authorised for local authority air pollution control with a further 1,726 to be determined. A further 17 Part B processes are regulated by HMIP (the Environment Agency from 1 April 1996).

The Minister said that he estimated that the forthcoming EC Integrated Pollution Prevention Control Directive would apply to 3,500-4,000 processes which are not covered by IPC (Part A processes); of these about 1,600 are currently Part B processes; the remainder was made up of between 1,000-1,500 intensive farms; large food and drink processing plants; plus various plants not presently covered by Part I of the EPA.

Implementation of the IPPC Directive will commence three years after its formal adoption, expected March 1996, when new plant and those undergoing substantial change will require a permit.

LAAPC CHARGES 1996/97

Increased charges for air pollution control applications etc

in England and Wales under Part I of the EPA came into effect on 1 April.

The fee for an **application** for authorisation is £1,015 for each process or £610 for each process if regulated under the *Alkali Act 1906*; the fee for a process transferring from IPC to APC on 8 January 1996 (and for which an IPC authorisation in force on 7 January) is £205. The application fee for waste oil burners remains at £100.

The fee for **varying** the conditions of an authorisation under either section 10 or 11 of the EPA is increased to £650 for each process to be substantially changed. Where the variation is required due to upgrading the fee is £100. In each case the variation fee for a waste oil burner is £65.

The annual **subsistence** charge is £625 or £645 if paid in quarterly instalments. The annual charge for waste oil burners remains at £100.

LEGISLATIVE CHANGES

Quite apart from the Environment Agency and SEPA opening their doors for business on 1 April, a large number of the *Environment Act* amendments and repeals also took effect. These include:

- **Statutory Nuisance, Scotland:** sections 16-26 and 36-37 of the *Public Health (Scotland) Act 1897* are repealed and statutory nuisance in Scotland will now be dealt with under Part III of the EPA - as amended by Schedule 17 of the *Environment Act*.
- **Control of Pollution Act 1974:** Schedule 16 of the *Environment Act* relating to pollution of rivers and coastal waters in Scotland introduces new sections 30F-30J and amends various parts of sections 31, 34, 39, 56 and 87.
- **Control of Pollution Act 1974:** Schedule 22 of the EA, paras 19-27 - various amendments to Part I of COPA (waste on land); para 28 (noise); para 29 - various amendments to Part II of COPA (water pollution in Scotland) including new section 42B relating to public registers. New sections 46A-D - notices requiring persons to carry out anti-pollution works in Scotland - came into effect on 12 October 1995.
- **Control of Pollution (Amendment) Act 1989:** Schedule 22 of the EA, para 37 (registration of waste carriers and seizure & disposal of vehicles used for illegal dumping).
- **Environmental Protection Act 1990:** Schedule 22 of the EA, paras 45-61 amend Part I of the EPA (some of the amendments took effect in October 1995); substantive additions include the requirement for LAs to have regard to the National Air Quality Strategy (s.4(4A) of EPA); duty of LAs to follow developments in technology and techniques for preventing or reducing pollution (s.4(9) of EPA); powers of enforcing authority to vary a variation notice (s.10(3A) of EPA); public registers including no information to be entered in the register until seven days following the day on which an appeal is finally determined or withdrawn (s.22(5) of EPA); s.28 of the EPA is amended to the effect the enforcing authority need no longer notify the WRA in its area that a process involves a final disposal to land.
- **Water Industry Act 1991:** paragraphs 97-127 of Schedule 22 have now all been brought into force (1 February and 1 April 1996); main changes include a new Part IIIA - Promotion of the Efficient Use of Water; and new section 101A, provision of public sewers otherwise than by requisition.
- **Water Resources Act 1991:** paragraphs 128-190 of Schedule 22 amend the WRA with many of the amendments, particularly those relating to pollution control, still to be brought into force.
- **Clean Air Act 1993:** All amendments (paras 195-199 of Schedule 22) came into effect on 1 April. The only substantive amendment has the effect of increasing the maximum fine for an offence under s.2 (emitting dark smoke from industrial or trade premises) from £5,000 to £20,000.
- **Radioactive Substances Act 1993:** The majority of the mostly minor amendments (paras 200-230 of Schedule 22) came into effect on 1 April (with a few taking effect during 1995).

Most of the *Environment Act 1995* has now been brought into force, although regulations covering the detail of implementation and enforcement are still awaited.

NEW NOISE LEAFLET

NSCA has helped the Department of the Environment and the Scottish Office in the production of a noise leaflet aimed particularly at noise-makers.

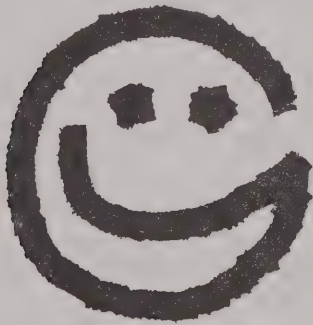
Noise - How to keep the peace with your neighbours

explains why noise can be a problem reminding readers that while you may find your music/DIY/barking dog etc relaxing or exhilarating, it may be driving your neighbour round the bend. The leaflet suggests various ways of keeping the peace such as giving advance warning of parties, doing DIY, housework etc at reasonable hours and making sure car or house alarms are properly maintained. Brief advice is given to noise sufferers and further sources of help and advice listed.

The leaflet is available from the DOE, Publications Despatch Centre, Blackhorse Road, London SE99 6TT; Tel: 0181 691 9191; Fax: 0181 694 0099.

GOING FOR GREEN

"Going for Green, Making a World of Difference - together", a new environmental campaign aimed at the public was launched in February and will last for three years. The campaign's slogan recognises that many people are already doing something positive about the environment. It emphasises that a lot of people carrying out small actions can make a big difference and carries the message that partnerships between like-minded people and organisations can make an even bigger impact.



Going for Green

Making a world of difference - together

A new national Green Code aims to promote awareness of sensible environmental behaviour and attitudes. It sets out five main objectives: cutting down waste; saving energy and natural resources; travelling sensibly; preventing pollution; and looking after the environment.

Although Going for Green has been launched with Government help, Secretary of State for the Environment, John Gummer, says that it is not a campaign in which the Government tells people what to do. Rather it is about people saying to one another "this is how we can change our lives".

For further information about Going for Green, telephone Russell Cialis on 0161-237 4032.

SUSTAINABLE SOIL

In publishing their 19th Report, *Sustainable Use of Soil*, the Royal Commission on Environmental Pollution called on the government to draw up and put into effect clear policies to protect soil, one of the three essentials (together with air and water) for life on land.

The report highlights the continuing pressures on soil in the UK - including intensification of agriculture, demand for land for building, extraction of peat and minerals and contamination - and suggests five principles which should form the basis of soil protection policy:

- soils must be conserved as an essential part of life-support systems;
- soil should be accorded the same priority in environmental protection as air or water;
- an integrated approach to environmental management must include management of land;
- contaminated sites should, wherever practicable, be recovered for beneficial use;
- further contamination of soils should be avoided.

Sustainable Use of Soil is published by HMSO (Cm 3165, ISBN 0101316526, price £24.20).

PLANNING AND NOISE

The Department of the Environment has appointed a consultant to carry out an assessment of the technical aspects of *Planning and Noise* (PPG 24).

The objectives of the work are to study the application of PPG 24, to identify any need for additional guidance and to make recommendations on possible methods that could be developed and adopted in the guidance. It is not intended to make any changes to policies and principles contained in the PPG.

Rupert Taylor, the noise consultant appointed to carry out this research contract, is asking all those in the field of planning and noise assessment who may have views on the need for additional technical guidance in the use of the advice given in PPG 24 to contact him to discuss the issues raised.

Topics likely to arise are circumstances not covered by the advice, need for clarification of technical procedures used in the noise assessment of development proposals, interaction with the requirements for environmental statements, possible ambiguities and uncertainties in determining Noise Exposure Categories, the roles of measurement and prediction and interfaces with statutory noise prediction methods, potential contradictions and ways of applying conclusions reached using other documents referred to in PPG 24.

Rupert Taylor will also be organising workshops in different parts of the country according to the strength of response to the consultations which are in progress. Those

interested should contact him on 01825 712435, Fax 01825 712542, Email 100675.1765@compuserve.com.

THIS COMMON INHERITANCE

Published at the end of March, the Government's fifth annual report on the environment, *This Common Inheritance* (CM 3188, £18.50) reviews progress made in achieving environmental objectives outlined in earlier reports and outlines priorities for the year ahead. These latter include

- publishing the National Air Quality Strategy;
- responding to the UK Biodiversity Steering Group's report on a costed target database, public awareness and local action;
- implement the *Noise Bill* (assuming it is enacted) - see this issue of *Clean Air*, page 5 - and work with local authorities and the police on other measures;
- promote consumer information to encourage the manufacture and distribution of less environmentally-harmful and more energy-efficient products;
- help promote prioritisation of environmental work under the EU Fifth Environmental Action Programme.

BPEO ASSESSMENT

One of HMIP's last acts before being subsumed into the Environment Agency was to publish a summary of their long awaited guidance to operators of IPC processes on best practicable environmental option assessments for IPC. The full guidance - *Environmental, Economic and Best Practicable Environmental Option Assessments for Integrated Pollution Control, Technical Guidance Note E1 (Environmental)* - which is in two volumes, was expected to be published by HMSO towards the end of April.

BPEO for IPC processes is defined as "the option which, for a given objective, provides the most benefit or least damage to the environment as a whole, at acceptable cost, in the long term as well as the short term as a result of releases of substances from an IPC process". The seven stages of BPEO assessment, for which further guidance is given are: define the objective (of the particular IPC process); generate options; evaluate the options; summarise and present the evaluations in a transparent and consistent manner; select the BPEO; review the BPEO; the seventh stage is implementation and monitoring which is an ongoing process which follows the choice of BPEO.

It is planned to refine the guidance in the light of experience of actual use of the procedure.

NSCA CENTENARY AND THE MILLENNIUM

The Society will be 100 years old on 10 January 1999. We shall want to celebrate not only our own Centenary but also the Millennium during the following year and the Council is already thinking about what we should do.

There is no doubt that celebratory events should look to the future and should generate environmental improvement. One theme might be how our experience can help youth to make life better in the new century. We should also underline the importance of sound science and rigorous analysis in initiatives which stimulated responsible action by individuals, community involvement and partnership.

Members will have their own views about our celebrations at local, regional, national or even international level. Can you let Council know by writing to me at NSCA - immediately if possible or certainly no later than 30 June - telling me what we should do, who might be our partners in the venture and who might sponsor it.

Lis Solkhon, Chairman, Conference and Promotions Committee

MEMBERS' NEWS

This edition of *Clean Air* features a new section of news about NSCA members. If you are up to something interesting, please let us know - and please check that your press office has us on their mailing list.

London Transport are doing their bit to reduce particulate pollution by running buses on low-sulphur diesel. Six hundred buses are using the new **Shell** low sulphur formulation, with a further 100 converting to an ultra-low sulphur reformulated "city" diesel. A total of 23 buses will also be fitted with oxidation catalysts which have been developed in association with **Johnson Matthey**. The £170,000 trial is being funded by LT and **Westminster City Council**.

Increasing interest is being shown in gas-powered vehicles. **Rugby BC** has taken delivery of the UK's first natural gas-powered refuse truck, jointly developed with **British Gas**, Dennis Eagle and Perkins Engines. **Bristol** now has a gas-powered bus, whilst **Warrington BC's** environmental wardens are currently driving around in seven gas-powered vans. A word of caution, though. At the recent NSCA/Middlesex University seminar on Particulate Pollution, Mike Hawkins of **Ford** showed research data on CNG engines suggesting that they also produce particulates, mainly in a range under 100 nm - well below PM₁₀. Other speakers at the seminar including Prof Roy Harrison and Dr Jon Ayres agreed that health concerns over PM₁₀ are now focusing on the very smallest particles in the size spectrum.

Planning a visit to **Croydon**? You can now call 0800 317 947 to check the air quality first. The council's new air quality hotline was opened recently by DJ and asthma sufferer Alan Freeman. **Hull City Council** has taken AQ information a step further by erecting an electronic bulletin board giving pollution forecasts and suggesting appropriate measures for the public. Also joining the information revolution, **South East Institute of Public Health** have developed a daily air quality bulletin page on the Internet with information from monitoring sites on the London Air Quality Network and affiliates. The address is <http://www-seiph.umds.ac.uk/envhealth>.

The **Atmospheric Research and Information Centre (ARIC)** based in Manchester is a multidisciplinary centre of excellence for the study and resolution of atmospheric pollution issues through research, information services and consultancy. ARIC has been operating a number of programmes including the Air Quality and Acid Rain Information Programme and the Global Climate Change Information Programme, both of which are supported by the DOE. ARIC's information sources are numerous and

many can be visited on the ARIC Internet pages; all addresses start with <http://www.doc.mmu.ac.uk/aric/> and end with the code for the particular page to be accessed:

- ARIC home page address: [arichome.html](http://www.doc.mmu.ac.uk/aric/arichome.html)
- AQ & acid rain information programme: [aricinfo.html](http://www.doc.mmu.ac.uk/aric/aricinfo.html)
- Global climate change information programme: [gcciphm.html](http://www.doc.mmu.ac.uk/aric/gcciphm.html)
- Emission estimation & predictive modelling: [emitmod.html](http://www.doc.mmu.ac.uk/aric/emitmod.html)
- AQ monitoring/data management: [airmonit.html](http://www.doc.mmu.ac.uk/aric/airmonit.html)
- AQ management: [aqmanage.html](http://www.doc.mmu.ac.uk/aric/aqmanage.html)

Speaking of the Internet, Ken Stevenson gave a dramatic demonstration to the **NSCA Spring Workshop** of the air quality information now on-line from NETCEN. How many people had access to the net? Very few delegates, it seemed, were yet able to download the huge volumes of real-time and historical AQ data which NETCEN plans to make available via <http://www.aeat.co.uk/products/centres/netcen/airqual/welcome.html>. Also at the Workshop, delegates heard that research on instrumented cars has revealed that a surprising number of car journeys were not just short trips - they were actually less than 50 metres. The purpose of such "trips" is a matter for speculation, but the research shows how little is still known about trip patterns and the likely implications for assessing emissions from motor vehicles.

At a recent meeting of the **NSCA West Midlands Division** members heard from Roger Key of Business in the Environment about the need to reach small and medium enterprises with environmental information. The Division also nominated Gavin Tringham of **Birmingham City Council** to represent the Society in a local debate on transport issues. A briefing has also been organised for the Midlands Regional Manager for the Environment Agency. Next meeting: 4 July.

The **Scottish Division** is mourning the loss of Calum MacDonald, who has taken up a new job with SEPA. In his place as the new Divisional Secretary, we welcome Tom McDonald of **Glasgow City Council**.

East Midlands and Eastern Division members travelled to East Lindsey for presentations on emergency planning in Lincolnshire, and on the use of spraybooths to meet the revised requirements for spray operations scheduled as Part B processes. This was followed by a visit to Conoco UK's Theddlethorpe terminal which is capable of supplying 25% of national gas requirements. Senior Environmental Scientist Simon Harboard spoke on

environmental issues surrounding gas reception, blending and export to **British Gas** and other customers. Future meetings: 27 June (AGM: Ratcliffe Power Station); 19 September (Leicester Environment City); 21 November (British Gas Research Station, Loughborough). Put them in your diary now!

At a recent meeting of the NSCA **West Midlands Division** members heard from Roger Key of Business in the Environment about the need to reach small and medium enterprises with environmental information. The Division also nominated Gavin Tringham of **Birmingham City Council** to represent the Society in a local debate on transport issues. A briefing has also been organised for the Midlands Regional Manager for the Environment Agency. Next meeting: 4 July.

Meanwhile...

We welcome the new **Environment Agency**, whose logo (below) was described in the launch leaflet as "representing the earth and future generations". Our initial interpretation was either a landfill site manager being mobbed by seagulls, or a pollution inspector trying to contain fugitive emissions from a Part A process. "The interpretation of the symbol will develop and grow along with the Agency" says the blurb. In order to assist this, we are offering a NSCA lapel badge or tie for the best suggestion from readers, to be printed in the next edition of *Clean Air*.



By contrast, **HMIP's** swan logo was depicted crying into its river on the cover of the final HMIP Bulletin, over the headline "Swansong".

Restructuring at **DOE** has seen the Local Environment Quality Division ("dogs and nuisance") transferred from

the Pollution Control Directorate to the new Air and Environmental Quality Division, headed by Richard Mills. We expect to see bonfires and pay parties scheduled under SI472 shortly!

The Second Reading of the Noise Bill provided an excuse for MPs to rehearse their favourite noise stories. One had trouble with Nepalese bagpipe-players, another ended up with a £240 bill after police and EHOs had broken into his house and torn out a misfiring burglar alarm. NSCA received honourable mentions during the debate, but most praise was heaped upon **Val Gibson** and the **Right to Peace and Quiet Campaign**. Whilst not agreeing with everything RPQC said, NSCA is sorry to learn that the Campaign is being wound up. They did a lot to raise the profile of noise issues and provided an important outlet for the views of noise sufferers. The Noise Bill is a tribute to their efforts.

Involvement in International Noise Awareness Day (24 April) has put NSCA in touch with a number of new anti-noise organisations. Canada's equivalent of the Right to Peace and Quiet Campaign rejoices in the title **Society for Soundscape Awareness**. Meanwhile a journal published by the New York League for the Hard of Hearing features an article on the hearing loss experienced by rock musicians. It cites "Pete Townsend of the WHO" as an example. If the composer of rock opera *Tommy* was responsible for developing the World Health Organisation's 55dB(A) guideline, he doesn't seem to have stuck to it...

Still on noise matters, delegates to the NSCA seminar **Noise Update 1996** enjoyed an interesting presentation from Ian Clark of the **European Commission** (see this edition of *Clean Air*). Plans for a European noise framework directive could lead to a requirement for local authorities to undertake noise mapping. Following local air quality management, local noise quality management cannot be far behind - remember you read it here first!

Finally, air pollution control officers in California have fined a member of the Klu Klux Klan for burning crosses in his back garden. *New Scientist* quotes an official from Jan Joaquin Valley: "We don't allow any burning unless it's for a bona fide agricultural purpose...the regulations are strict because the valley traps pollution. If everyone burnt crosses we simply wouldn't be able to breathe".

NSCA ON LINE

Not content with one webpage (see *Clean Air*, vol. 25, no. 4), NSCA now has a further website at <http://envirocom.com>. At this address you will also find other environmental organisations and links to national and international agencies. Our thanks to envirocom for providing us with this service.

FUTURE EVENTS

23 MAY - Air Quality: Monitoring and Management

Joint seminar organised by the West of England Branch of the CIEH and the South West Division of NSCA. Speakers will examine how local authorities can meet their new responsibilities for delivering local air quality as laid down by the *Environment Act 1995*.

Venue: The Winter Gardens Pavilion Conference Centre, Weston-Super-Mare.

Details: Peter Gendle, Tel: 01934 634839; or Tony Molloy, Tel: 01934 634805.

23 MAY - Environmental Impact of Major Chemical Accidents

Papers will include: regulatory aspects; emergency response arrangements in the Environment Agency; emergency planning guidance; legal aspects of major accidents; and development of environmental risk criteria.

Venue: SCI, 14/15 Belgrave Square, London SW1.

Details: Society of Chemical Industry, Fax: 0171 823 1698.

23 MAY - Dealing with the Practicalities of Contaminated Land

A detailed analysis of the fundamental issues surrounding the new contaminated land regime introduced by the *Environment Act 1995* and its impact on property transactions.

Venue: Balmoral Hotel, Edinburgh,

Details: Sally Bate, IBC UK Conferences Ltd, Fax: 0171 631 3214.

23 MAY - Integrated Pollution Control

A one day legal and technical briefing on IPC, the impact on industry of the EC's draft Directive on Integrated Pollution Prevention and Control; also an update on the EC's proposals on Civil Liability for Environmental Damage.

Venue: Forte Crest Bloomsbury, London.

Details: Sally Bate, IBC UK Conferences Ltd, Fax: 0171 631 3214.

11 JUNE - Seminar: Gas, Electric and Eco-Vehicles

Towards zero emissions and sustainable transport - this seminar aims to bring people together to discuss a variety of new ecological transport proposals and practical trials being undertaken by individuals, local authorities and other organisations. A number of electric vehicles will be on display outside the venue. This seminar is supported by - among others - the Electric Vehicle Association, Transport

2000 and the Association for the Conservation of Energy.

Venue: St. Peter's Church, Vere Street, London W1.

Details: R.E. Shorter, 32 Balderton Buildings, Balderton Street, London W1Y 1TD.

1 JULY - 22 AUGUST - Environmental Assessment and Management

Eight week intensive course (can be attended on a full-time or weekly modular basis) designed to provide a detailed understanding of the principles of EA and of the specific techniques to undertake EA.

Venue: University of Aberdeen.

Details: Jane Butler/Doug Reid, Centre for Environmental Management and Planning, Fax: 01224 487658.

2-3 JULY - Eco-Management and Auditing Conference

Aimed at those interested in corporate environmental management and also of interest to local authorities involved in local initiatives, this conference aims to facilitate in-depth discussion of environmental management systems, associated standards and auditing methodologies.

Venue: University of Leeds.

Details: EMA Conference Organiser, ERP Environment, Fax: 01274 530409.

30 JULY - 2 AUGUST - Inter-Noise 96

Noise - the next 25 years: scientists, engineers and legislators in partnership. Organised by the Institute of Acoustics and sponsored by the International Institute of Noise Control Engineering, this conference will include all aspects of the legislative and technical assessment and control of noise. *Venue:* Liverpool.

Details: Institute of Acoustics, Fax: 01727 850553.

16-17 SEPTEMBER - Incineration of Municipal Waste with Energy Recovery

Short course providing detailed introduction to the incineration process; specialist lectures on the theory and practice of incineration including combustion, incinerator design, refractories and pollution.

Venue: Westwood Hall, Leeds.

Details: Miss Julie Charlton, Dept of Fuel & Energy, University of Leeds, Fax: 0113 233 2511

16-17 SEPTEMBER - European Environment Conference

In its sixth year, the focus at this conference is on practical papers aimed at improving environmental performance in a European context; in parallel streams, issues to be covered

include IPC, waste management, energy, air and water quality, regional and local environmental initiatives and environmental assessment. Special rates apply for those attending both this and the Business Strategy and Environment conference.

Venue: University of Leeds.

Details: ERP Environment, Editorial and Conference Office, Fax: 01274 530409.

19-20 September - Business Strategy and the Environment Conference

This conference will concentrate on what industry is doing to improve its environmental performance and on the analysis of tools to develop it further; there will also be discussion on how business can contribute to the move towards sustainable development. Special rates apply for those attending both this and the European Environment Conference.

Venue: University of Leeds

Details: ERP Environment, Editorial and Conference Office, Fax: 01274 530409.

FORTHCOMING NSCA EVENTS

Wednesday 5 June

Dispersion Air Modelling

NSCA Seminar on behalf of the

Air Dispersion Modellers Group

Chadwick Court, 15 Hatfields, London SE1

Tuesday 18 June

Traffic Management for Air Quality

Training Seminar

NEC, Birmingham

Tuesday 16 July

Towards a Greener Fleet

- the potential for alternative vehicle fuels

Seminar, NSCA with BRS Car Leasing

NEC, Birmingham

Monday 21 - Thursday 24 October

Environmental Protection 96

NSCA's 63rd Annual Conference

Brighton

Tuesday 26 November

Waste Management

Training Seminar

NEC, Birmingham

Tuesday 11 February 1997

Training Seminar

NEC, Birmingham

Tuesday 15 and Wednesday 16 April 1997

NSCA's Annual Spring Workshop

Abingdon, Oxfordshire

For further details please contact

National Society for Clean Air and Environmental Protection

136 North Street - Brighton BN1 1RG

Tel: 01273 326313

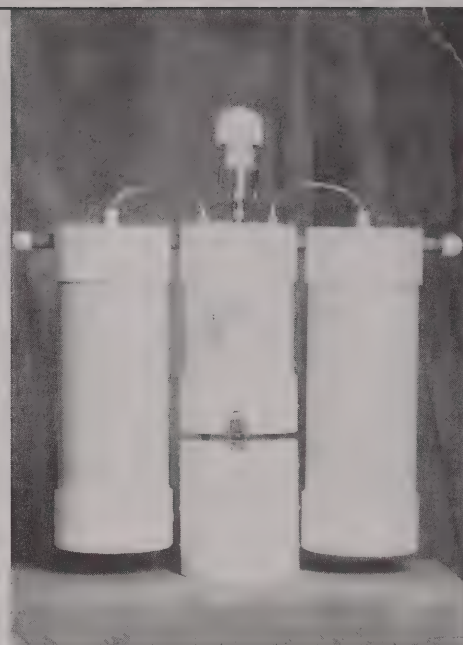
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- Physical Models of Air Pollution for AQ Reviews
- Size Fractionation & Ionic Composition of Particles in Greenwich
- Environmental Management & Assessment in Sutton
- NSCA Factsheet - Asthma and Air Quality

Volume 26

Number Two


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The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programmes.

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19 Oxgate Gardens, Brent, London NW2 6EA

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South & Mid Wales Division: Robert West – Telephone: 01222 871142

1 Glynn Collen, Llandbradach, Caerphilly, Glamorgan CF8 3PP

EDITORIAL

A Draft of Fresh Air

The draft National Air Quality Strategy has at last been released for comment to statutory consultees. Following a number of false dawns - which last month led NSCA to write in exasperation to the Prime Minister asking that interdepartmental wrangling over the strategy be halted - we now have a clear view of the detail likely to make up the Strategy proper when it is issued for public consultation later this summer. Given the wide range of interests within Government and beyond, it is a testament to the DOE that the coherent vision established in *Air Quality - Meeting the Challenge* has been consolidated, with weasel words kept to a minimum.

Industry, the transport sector and local authorities are picked out as key contributors to the strategy. The domestic, commercial and agricultural sectors are given an easier ride. Links to other aspects of environmental strategy are also weak. The air quality implications of a change in the landfill-incineration balance in the Government's Waste Strategy are treated briefly, and the interplay between local air quality and greenhouse gas emissions in the road transport sector is scarcely mentioned. The Strategy is explicitly health-driven, although benefits to ecosystems and materials may accrue as a bonus. The standards which underlie the policy objectives, and which are in turn quantified as targets, are based on EPAQS or WHO health guidelines.

The Government is confident that standards for benzene, 1,3 butadiene, carbon monoxide and lead can be met by its 2005 deadline. The priority pollutants which will require further measures are sulphur dioxide, ozone, nitrogen dioxide and particles. We are promised that such measures will be subject to cost-benefit assessment, but told that many of the costs are incalculable and most of the benefits intangible. The speculative economic data relates to material and crop damage, rather than health.

We know that local authorities are keen to get on with air quality management, yet DOE continues to apply the accelerator and brake simultaneously. LAs are encouraged to start the process of AQ management as soon as possible, but urged to wait for the regulations and guidance. However there is encouraging news on management tools for LAs. Regulations to deal with stationary vehicles are promised, with the prospect of an extension of nuisance and smoke control powers, and legislation allowing local taxation of non-residential parking, congestion charging or area permits. (By contrast, references to potentially unpopular *national* fiscal measures to target traffic pollution are largely absent.) Significantly, the Government confirms that *all* LAs should develop local air quality strategies - not just those authorities likely to declare AQ management areas. These should be subject to wide consultation and integrated with broader sustainability objectives.

There are some weasel words and numbers. The targets set for the most troublesome pollutants are "indicative" and will be subject to review; whether cost-benefit or new science will play the larger part in any reassessment remains to be seen. The target percentile achievement of standards varies from 100% for CO, 99.5% for PM₁₀ (allowing two days grace for bonfire night!), down to 97% for ozone. It will fall to LAs to determine how far exceedences are significant "in exposure terms", opening the door to uncertainty on the declaration of AQ management areas. There is no encouraging news on the allocation of resources.

Some wrinkles can be ironed out. A three-year review will be the first major opportunity to evaluate the effectiveness of the Strategy, and to follow up specific questions such as the long-term 1 ppb benzene standard and the extension of the Strategy to ecosystems. In the meantime we particularly welcome the promise of a national Air Quality Forum - something NSCA has campaigned for since the abolition of the Clean Air Council. This should maintain an independent overview of the Strategy's objectives and implementation, and advise on balance with other environmental, social and economic policy objectives. We believe it has the potential to become an essential safeguard for air quality in the UK.

Parts of the draft remain unfinished or may be subject to change. One thing is certain - the final consultation paper will be issued this summer, and it will set the course for air quality into the next century. A thoughtful and constructive response to the Strategy is at the very top of the NSCA agenda, and we rely upon the expert views of our members, Divisions and Committees to inform the debate as we continue the fight for clean air.

REPORTS

Physical Models of Air Pollution for Air Quality Reviews

Douglas Middleton
Atmospheric Processes Research
Meteorological Office

© Crown Copyright 1996

On Tuesday 26 March 1996 the NSCA Spring Workshop addressed Local Air Quality Management - from Assessment to Action. The Department of the Environment is supporting work to prepare technical guidance on topics including emissions, monitoring, and modelling. This note defines what we mean by modelling in this context. Modelling consistent with the EPAQS standards is discussed. Recent work illustrates the role of physics based models, and finds important limitations of the method in the Department of Transport's Design Manual for Roads and Bridges (DMRB). New work to find a nomogram for street canyons is described. A new model for SO₂ plumes is outlined and two conditions for an SO₂ episode discussed. Air quality reviews should relate results to published data compilations and established simple methods. Reviews should consider the limitations of modelling, match the modelling to the monitoring, and check for consistency between emissions inventories, meteorology and dispersion modelling. Reviews should also seek physical explanations for observed pollution episodes.

Environment Act 1995, Part IV

Under the Act local authorities have duties to review air quality and inform the public; section 82(1) (local authority reviews) states:

"Every local authority shall from time to time cause a review to be conducted of the quality for the time being, and the likely future quality within the relevant period, of air within the authority's area."

Section 87(2) enables regulations to be made covering a variety of issues relating to local air quality including

"(k) for or in connection with the communication to the public of information relating to quality for the time being, or likely information relating to quality for the time being, or likely future quality of the air".

This paper explores aspects of modelling for air quality reviews.

Running Means

Averaging times cited by the Expert Panel on Air Quality Standards (EPAQS) range from 15 minutes to 1 or 8 hours, to 24 hours or even 1 year: they are *running means*, or arithmetic averages of the relevant number of hourly average concentrations. For example 8 sequential hourly points are summed and divided by 8 to get the first running mean; then move on one place and repeat using the new point and 7 of the points used previously.

Figure 1 shows hourly data for ozone in Bexley during May 1995, and the resulting 8 hour running means. The

photochemical episode early in May 1995 has high daily ozone peaks, and the running mean crosses the EPAQS value at 50 ppb for 8 hours. Figure 2 has hourly PM₁₀ data for Belfast during December 1995 along with the 24 hour running means. This plot shows significant exceedance of the EPAQS value of 50 µg m⁻³. Note that the effect of the running average is to smooth out the fine scale fluctuations, but that the larger pollution peaks are still clearly visible.

In carrying out any air quality review, pollutant levels should also be compared with the many published works, including reports on monitoring from WSL or NETCEN (e.g. Bower et al, 1995), and the compilation of data in the *Air Quality A-Z*, Bertorelli and Derwent (1995).

Expert Panel on Air Quality Standards (EPAQS)

The review of air quality should compare local air quality with standards such as EPAQS. Modelling will need the same averaging times as in the EPAQS recommendations:

- Ozone: maximum 8 hour running mean - 50 ppb
- Carbon monoxide: maximum 8 hour mean - 10 ppb
- Benzene: annual running mean - 5 ppb; 1 ppb at a date to be set by HMG
- 1,3 - Butadiene: annual running 1 hour mean - 5 ppb
- Sulphur Dioxide: maximum 15 minute mean - 100 ppb
- Particles PM₁₀: maximum 24 hour running mean - 50 µg m⁻³

Recommendations for nitrogen dioxide, lead and polycyclic aromatic hydrocarbons (PAH) are pending.

Modelling

Modelling represents the 'real-world' in mathematical terms based on physical principles. Pollution transport is governed by the wind speed and turbulence. Turbulent mixing is a random process and is inherently uncertain; it varies with the stability of the atmosphere. Concentration is modelled by the rate of emission divided by the rate of mixing.

Modelling seeks a more precise understanding of the significant behaviour of air pollution measurements. Modelling gives us the means to check for consistency in the emissions inventories, observed meteorology, and measured concentrations of pollutant. Modelling hopefully allows some form of prediction of future events, whether short term episodes or long term trends. Modelling in the present context is a process to calculate concentration based on physics - the idea that concentration (mass/volume) is the rate of emission (mass/time) divided by the rate of mixing (volume/time). The first term is from an emissions inventory, the latter is from the meteorology.

Turbulence

The spread of material both horizontally and vertically is governed by turbulence. The *Concise Oxford Dictionary* defines turbulence as:

- An irregularly fluctuating flow of air or fluid
- Meteorol: Stormy conditions as a result of atmospheric disturbance
- A disturbance, commotion, or tumult.

The first definition is most appropriate to the spreading of pollutants in the atmosphere. It implies that whether defining wind speed, or the concentration of pollutant, some continual variation in magnitude is to be expected. The rapid and continuous fluctuations in wind velocity (Figure 3) show on a time scale plotted in seconds how fast the wind varies. It is therefore necessary when taking measurements or modelling to average the data over some averaging time. Hourly averages are often used for pollution data. The way in which the meteorological conditions are used to estimate atmospheric stability and the rate of turbulent mixing is described in some detail in *Meteorological Aspects of Air Quality Modelling* (Middleton, 1994 NSCA Spring Workshop, Local Air Quality Management). We should remark at this point that the averaging times cited in the EPAQS standards above are based upon health considerations.

Chemistry

For some pollutants, modelling must describe the chemistry as well as the turbulent mixing and movement by the wind.

For NO_2 we can first calculate the NO_x because nitrogen is conserved, but must then subdivide it into the constituent parts, NO_2 and NO_x . The empirical curve fit by Dick Derwent gives the NO_2 as a function of NO_x , is based upon measurements, and combines the effects of chemistry and mixing. This curve has been used to produce a nomogram for the NO_2 , NO and NO_x system (see Figures 2 and 3 in Derwent and Middleton, 1996). The dispersion of NO_x from roads has been modelled and this function applied to get the resulting concentrations of NO_2 , as below.

Guidance

For local authorities to conduct air quality reviews, there is a need for simple and reliable methods of modelling dispersion. The Met Office is assisting in the preparation of technical guidance for use in these reviews. The *Design Manual for Roads and Bridges* is a good starting point as it gives a graph of one hour average concentration of NO_x decreasing with distance out to 200 m from the road as in Figure 4 (Figure 2c, DMRB, 1994). The distance is measured perpendicular to the road axis, from the centre of the road to the receptor. The graph is for standard traffic conditions, i.e. a flow of 1000 vehicles per hour travelling at 100 km/h. The 1995 average light duty vehicle at a speed of 100 km/h is assumed to have an emission factor 2.45 g/km for NO_x . The atmospheric stability class is neutral (class D), the wind speed is 2 m/s, with wind direction evenly distributed around the compass.

Roads

The motorway interchange pollution model which the author developed for motorways, such as Spaghetti Junction in Birmingham, can model pollution blown from networks of straight or curved roads of limited length or from roundabouts, Middleton et al, 1979. The new SPAGLINK model is based closely on the original SPAG68 model, but uses the modern emission factors in g/km; (at the time the original model was developed, emission factors in this form were unknown quantities).

The new model was used to model four situations with a road running from -1 km to the East to +1 km to the West. Receptors were spaced from 10 metres to 800 metres along a line North-South perpendicular to the road at its centre. The wind speed was 2 knots, 1 m/s, half that in the DMRB graph, so would tend to give larger concentrations. A traffic flow of 1000 vehicles/hour was used. The emission factor was 1.8 g/km for NO_x , taken from Derwent et al (1995), which would give smaller values than the DMRB graph. Five curves are given for NO_x and NO_2 in each of the four examples. The lowest concentrations are for unstable conditions (Class A), the highest concentrations are for stable conditions (Class E), while the second highest curve shows the results for neutral stability (Class D). Figures 5-8 show the decrease in pollution with perpendicular distance from the road. Depletion of ozone near the road where NO

concentration is high is reflected in the non-linear function for the empirical ratio $\text{NO}_2 : \text{NO}_x$ from Derwent and Middleton (1996). Therefore in all four examples, the decay of NO_2 is a different, typically less steep decay with distance from the road than is seen for the NO_x .

The four cases to consider are:

1. Figure 5: one road, wind 0 degrees, perpendicular to the road axis. Concentrations of NO_x decay with distance, similar to DMRB, whereas the decay of NO_2 is different.
2. Figure 6: one road, wind 90 degrees, parallel to the road axis. Concentration at the road is *higher* than for case 1 because the wind is now blowing the plumes along the road axis. Concentrations *decrease more rapidly* away from the road than in case 1.
3. Figure 7: three roads, wind 0 degrees, perpendicular to the road axes. Here concentrations decrease away from the first road, but increase on reaching the second and third roads. They decay beyond the third road. Concentrations of NO_x are additive, but due to the ozone depletion, concentrations of NO_2 are not additive. The build up of NO_2 is slower than expected, and the decay is also altered. This shows how important it is when conducting an air quality review of NO_2 near to a road in an urban setting to take the upwind or background concentrations of NO_x into account before the NO_2 is estimated from the combined level of NO_x .

The absence of a method for NO_2 is a notable deficiency of the DMRB. In the absence of background contributions, DMRB gives just the pollution contribution from the road assuming 'rural' or clean air. DMRB also assumes that the road is infinitely long in both directions relative to the location of the receptor, but this is not so serious a limitation as the lack of background and the omission of non-linearity due to ozone depletion.

Finally, in very stable atmospheric conditions such as were seen in London during the NO_2 episode of December 1991, it is clear that the DMRB method, which was not designed for persistent strong stability, cannot apply because the strongly stable conditions meant there was a very large background level of pollution right across the city.

4. Figure 8: three roads, wind 90 degrees, parallel to the road axes. The wind blows the plumes along the roads, so the peaks along each road and the troughs between them are plain to see. In this case the decay to the right of the third road is very similar to the decay to the right of the single road in case 1.

In summary, the DMRB gives a basis for a first stage review of air pollution from roads of infinite length in the case of CO , NO_x and hydrocarbons, but is unable (without extension) to be applied to specific wind directions. It

requires extension to include the non-linearity of NO_2 by means of the $\text{NO}_2 : \text{NO}_x$ nomogram; remember, however, that this is only valid if the upwind or background NO_x has first been estimated and added to the NO_x from the road. The DMRB method does not predict the observed but occasionally severe winter episodes of NO_2 .

City Streets

The highest exposures to traffic derived pollutants may be in street canyons, where the presence of buildings can cause a recirculating flow (Figure 9). Pollutant concentrations are higher on one side of the street than the other according to wind direction.

At a recent meeting held at the Met Office to discuss Interpretation of Air Quality Data, we were asked if a nomogram might be developed from the street canyon model developed by Adrian Buckland (to be published; this will include his validation work for sites in London and Birmingham) after work done in Denmark by Hertel and Berkowicz. Here is the result of our efforts so far.

Figure 10 is a polar diagram of concentration plotted radially. The innermost contour is the concentration for wind speed 8 m/s (the strongest wind speed has the lowest pollution). Successively larger concentration contours are for 6, 4 and 2 m/s respectively. The concentration scale is marked as broken circles every 50 ppb. The high and low pollution sides of the street can reverse as the wind swings round the compass; so to use the nomogram it must be rotated to be parallel with the street axis and with the receptor on the proper side of the street. For an east-west street canyon, the figure can be used the normal way up to estimate concentration on the south side of the street. For a receptor on the north side of the street, turn the figure round. At any wind direction the concentration is read by following the wind from the receptor until you meet the relevant sized contour for the wind speed of interest. As shown here, the wind is from 210 degrees, and the receptor is on the south side of an east-west canyon. At 4 m/s the estimated concentration is 260 ppb NO_x for the traffic flow of 4000 vehicles/hour in a canyon 20 m wide and 20 m high. Traffic speed affects the dispersion and is 5 m/s here.

This work to develop simple methods suitable for the first stage review in Local Air Quality Management under the *Environment Act 1995* is still in progress and the diagrams subject to amendment.

Non-Local Pollution

Some problems may not be of local origin. The EPAQS standard for SO_2 is 100 ppb and has a 15 minute averaging time designed to protect sensitive individuals. SO_2 is transported long distances from power stations and similar large point sources. It undergoes a variety of physical processes, such as dispersion, deposition, and chemical reaction (Figure 11). Over the last 10 years the Met Office

has developed a powerful dispersion model for these plumes which uses the meteorological data files that are generated during the numerical weather forecasts. When applied to large sources of SO₂ (Figure 12) the paths of individual plumes are clear to see so that ground level episodes can be forecast or explained after the event. In essence two events must occur for an episode to be seen:

1. The winds aloft must bring the particles in large numbers over the point of interest, and
2. The evolving mixing height (defined in Figure 11) must be above the plume at just the right height to trap the particles from going too high and ensure a large concentration occurs at the ground.

Ozone is also a pollutant that is essentially non-local in origin. It requires chemistry as well as long range transport to be modelled.

Accuracy

The accuracy of modelling is important in air quality reviews, especially if significant planning decisions are implied. A factor of two over and under forecast limits on the accuracy are quite common. Large uncertainties in dispersion modelling have several reasons:

- errors in emissions estimates
- errors in meteorology
- inappropriate dispersion model structure.

Long data runs are needed to obtain reliable data on errors in the modelling process. Our study of forecasts for several towns over six months plotted the forecast error against town size. This revealed there was under-forecasting in smaller towns. The two most likely causes currently being investigated are:

- limitations in the model BOXURB used for the forecasting;
- emissions data being too small in the small towns.

This emphasises the point that in air quality review, models and measurements should be used together for the best understanding of local problems.

Conclusions

1. *Environment Act 1995*: Air quality must be reviewed, and the public informed. This includes future air quality. Reviews should relate the concentrations to published reports and compare them with standards.
2. EPAQS: Uses averaging times from 15 minutes to 1, 8, 24 hours to 1 year; models should address these times.
3. Physics Based Models: Represent the 'real world' so are useful for understanding the measurements, including episodes. They can predict future likely air quality including forecasts and the implications of town planning on future air quality. They can generate simple nomograms and diagrams.

4. Modelling has several advantages but it is important to recognise its limitations. We should match measurements to model results and seek to explain pollution episodes using models. Models will be used for planning, so do check for consistency in your air quality information.
5. DOE and local authorities: Full implementation of the *Environment Act 1995* is expected to occur in April 1997. Pilot schemes began in April 1996; the Met Office is assisting local authorities with advice, providing a Helpline on 01344 85 6964/Fax 4493, is developing nomogram methods, and is writing draft technical guidance for DOE.

Acknowledgement

This note describes work that was supported by the Department of the Environment, Air and Environment Quality Division. We are grateful for the encouragement received during the work. Any views expressed here are those of the author.

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Figure 1. Ozone at Bexley in May 1995 (top); 8 hour moving running means (below) exceed the EPAQS Ozone standard in warm anticyclonic flow from Europe.

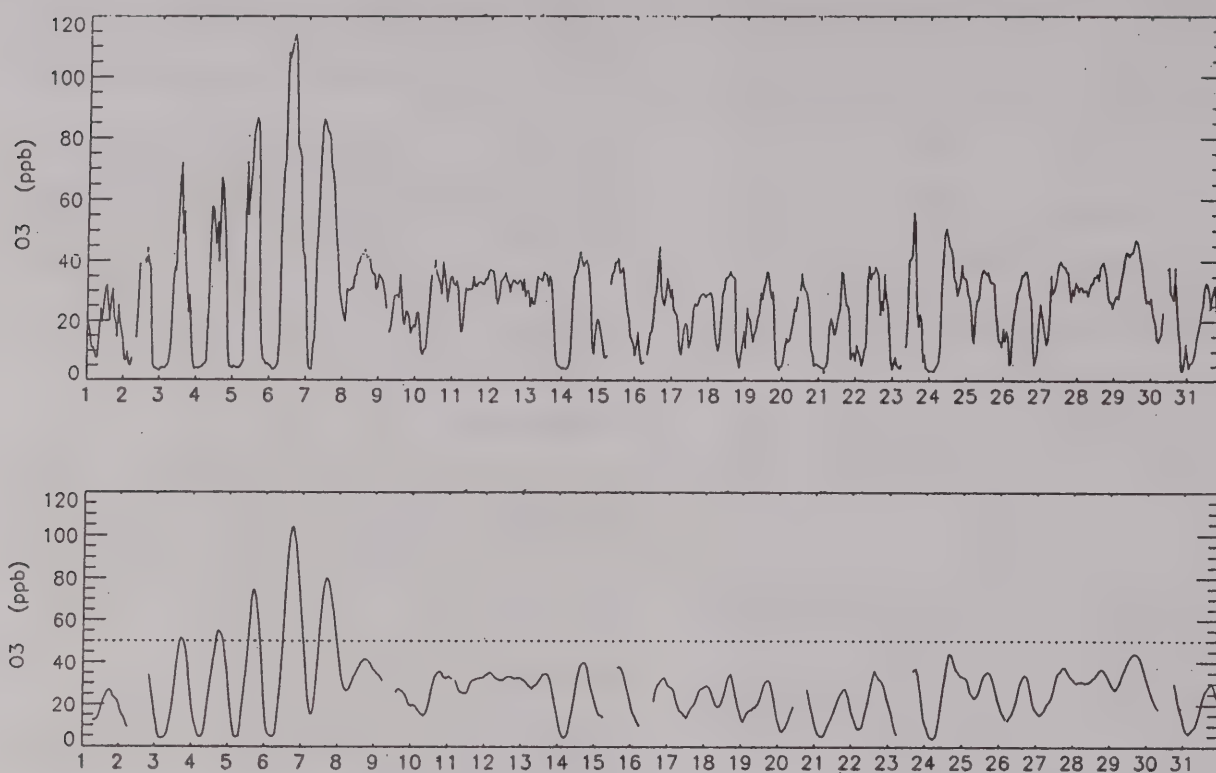


Figure 2. PM₁₀ at Belfast in December 1995 (top); 24 hour moving running means (below) exceed the EPAQS PM₁₀ standard in cold anticyclonic conditions.

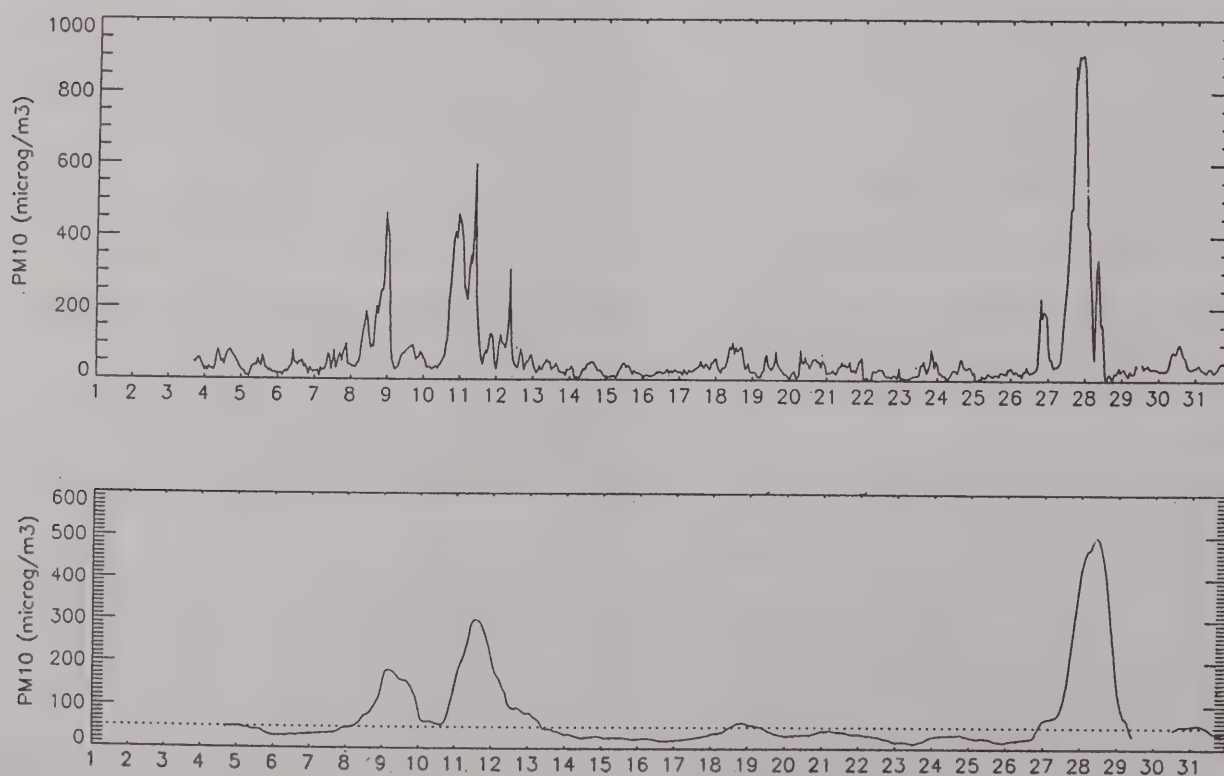


Figure 3. Fast wind fluctuations in the two horizontal directions (denoted u,v) using three adjacent anemometers (denoted K Kaijo Denki sonic, G Gill sonic, P Gill propellor) 6 m above the ground; courtesy ALM Grant.

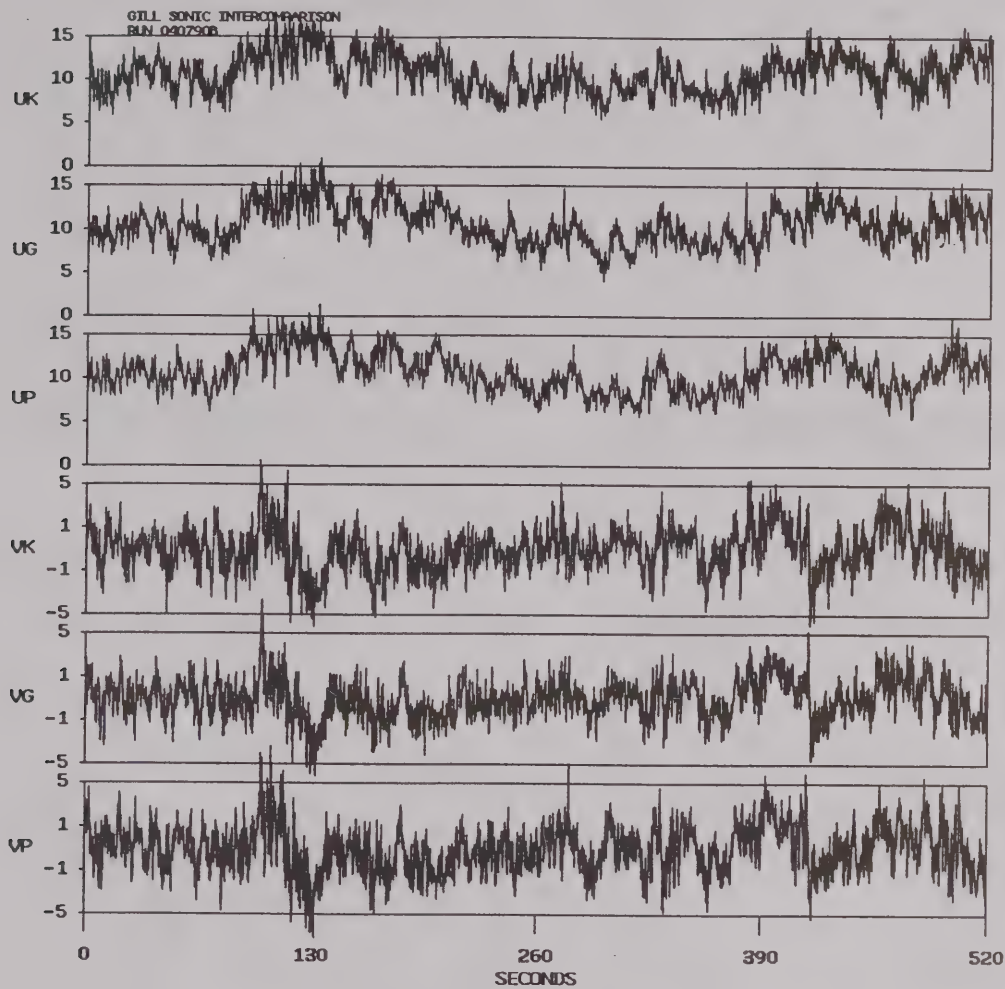


Figure 4. Decay of NO_x with distance from a road; from Figure 2c, DMRB 1994.

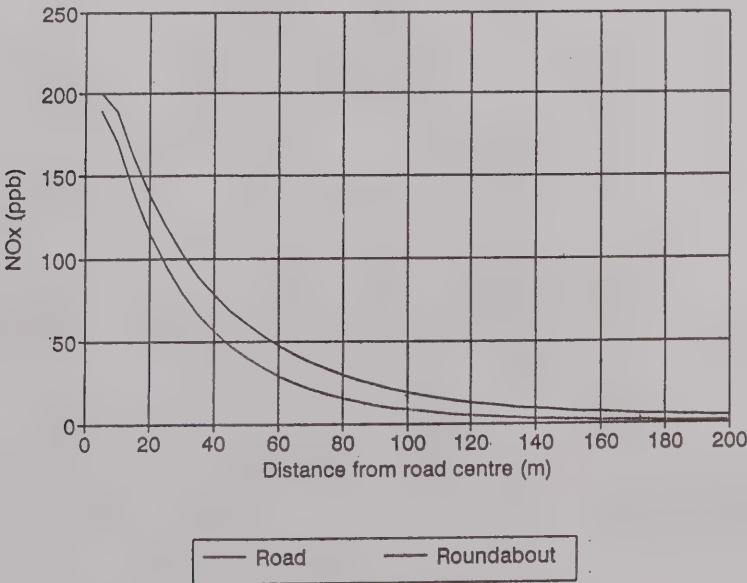


Figure 5. NO_x and NO₂ from a road, wind across the road, from SPAGLINK model.

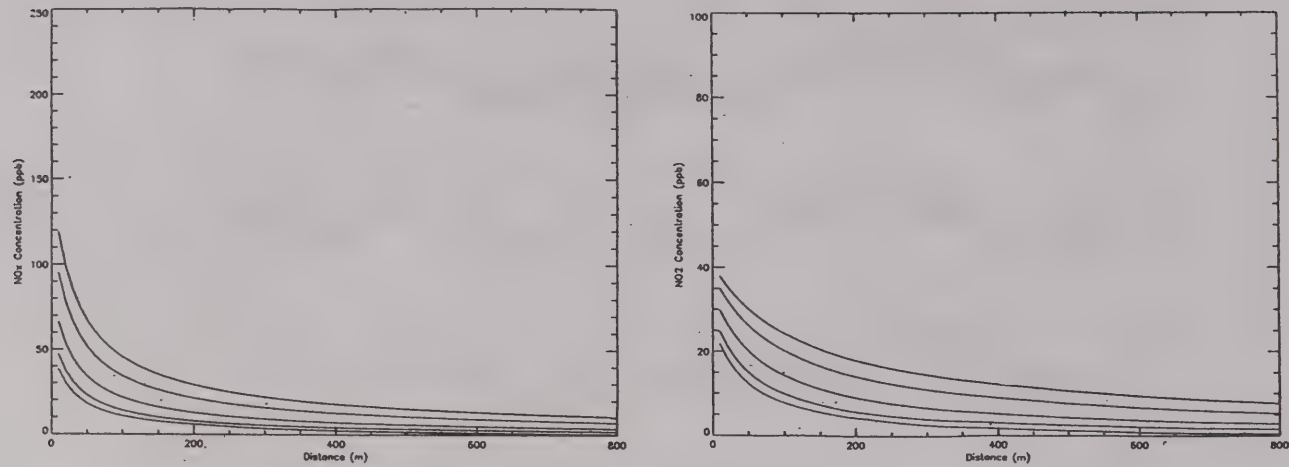


Figure 6. NO_x and NO₂ from a road, wind along the road, from SPAGLINK model.

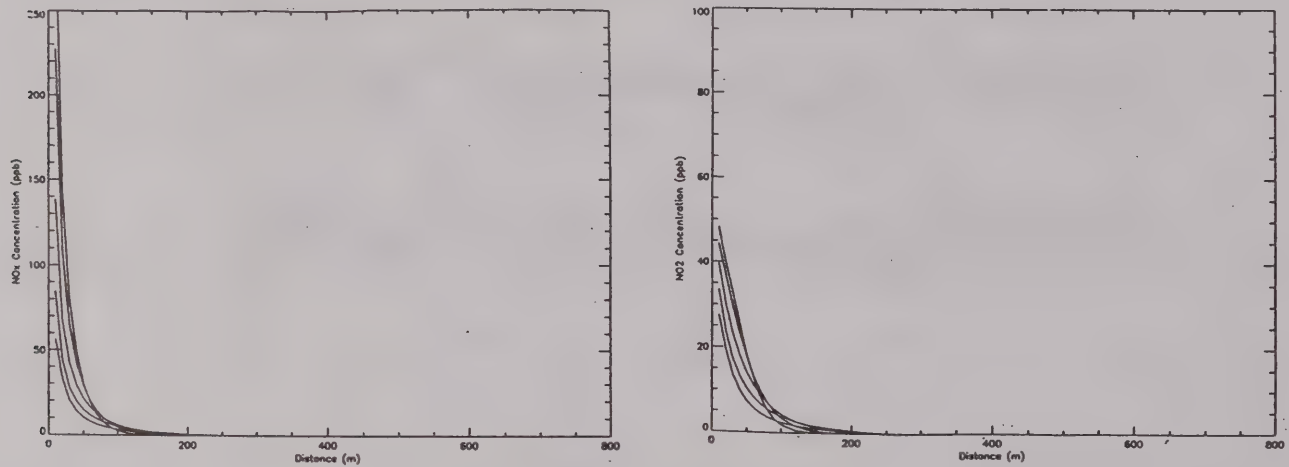


Figure 7. NO_x and NO₂ from three parallel roads, wind across the roads, from SPAGLINK model.

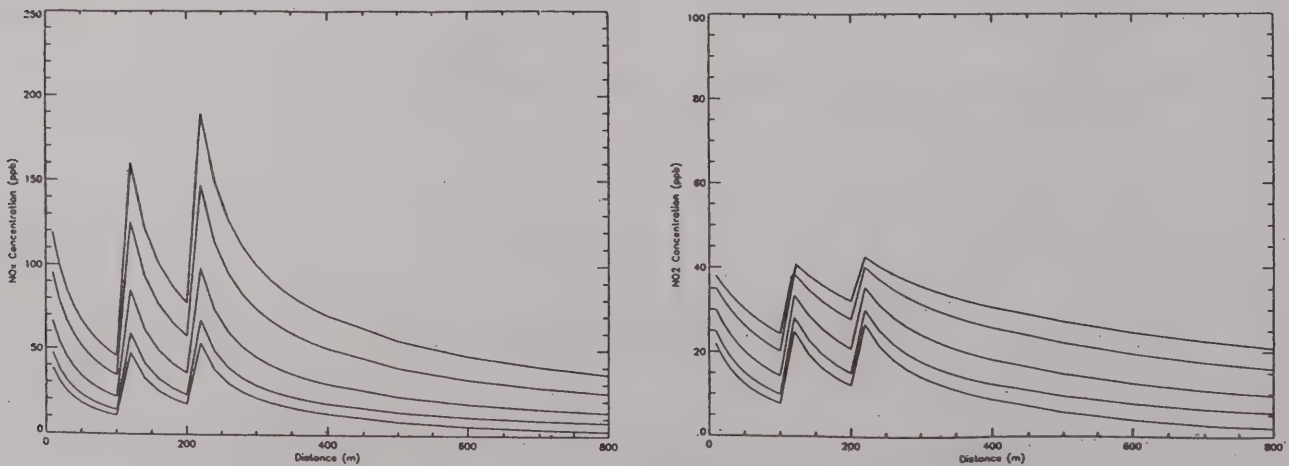


Figure 8. NO_x and NO₂ from three parallel roads, wind along the roads, from SPAGLINK model.

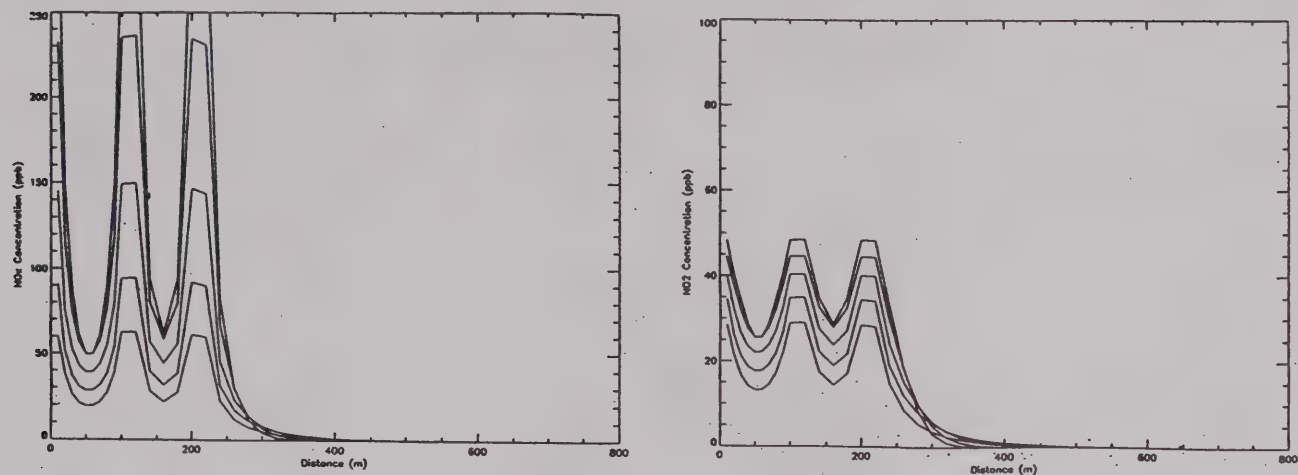


Figure 9. Diagram of recirculating flow and restricted mixing in a street canyon, courtesy AT Buckland.

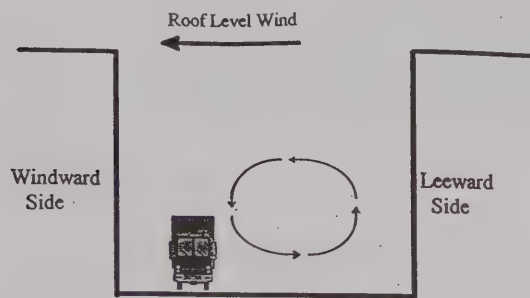


Figure 10. Prototype polar diagram by Buckland and Middleton of pollution (radially) according to wind direction across a street canyon; diagram should be oriented with the road axis and placing receptor on correct side of street.

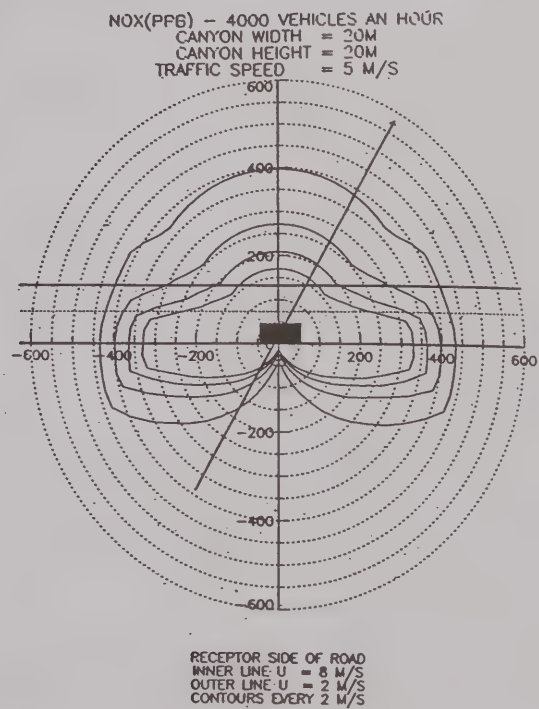


Figure 11. Processes involved in the deposition of atmospheric pollutants during long range transport.

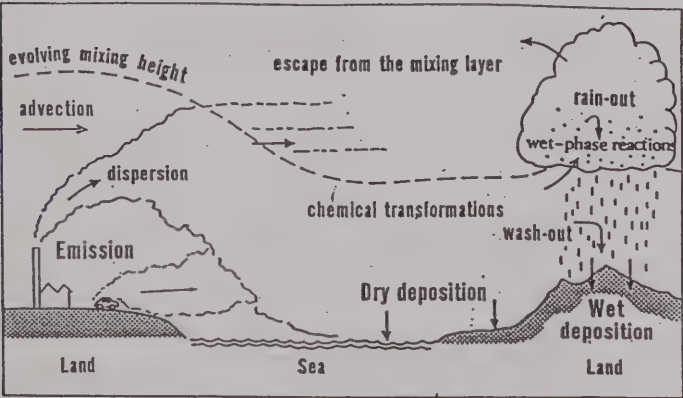
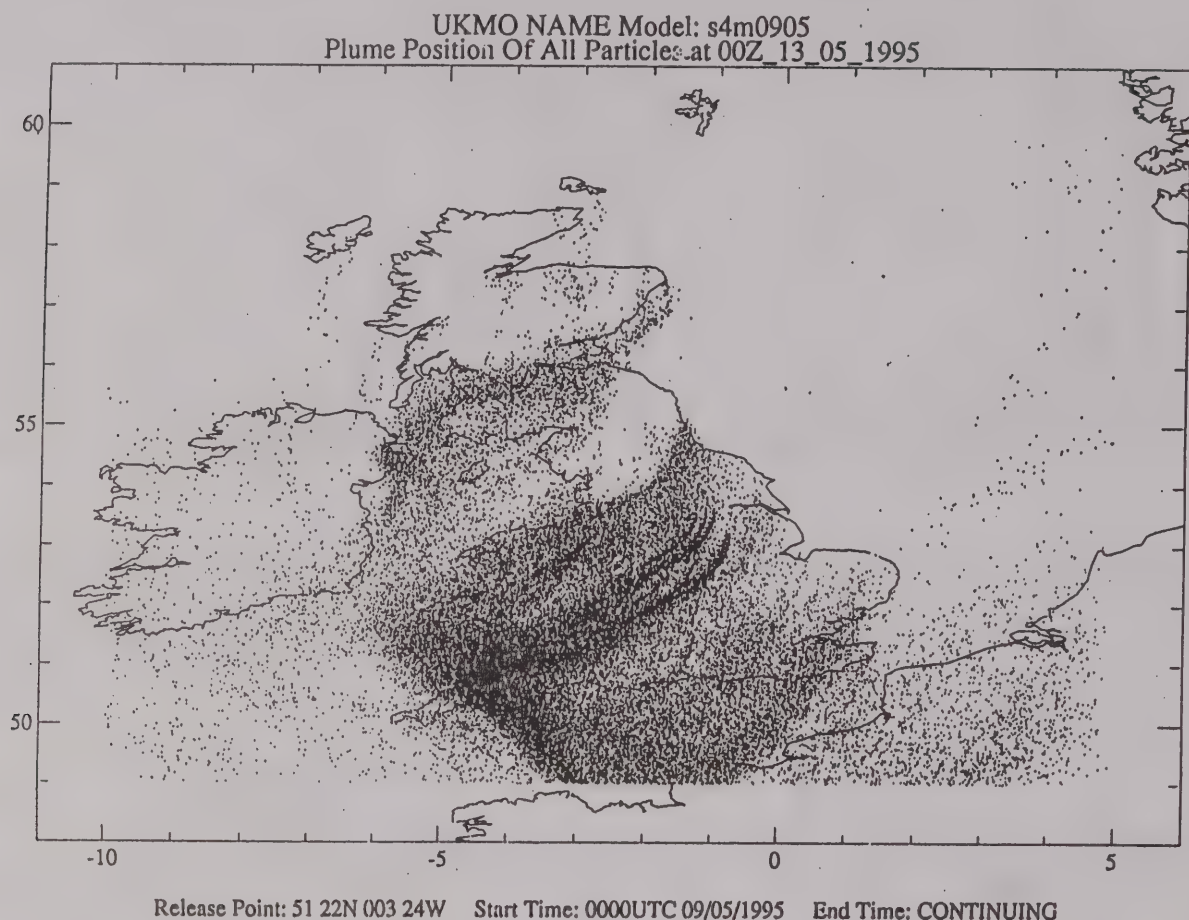


Figure 12. Particle trajectories modelled by the Met Office NAME Sulphur model, showing plumes from power stations, courtesy Maryon, Kitchen and Ryall.



PRELIMINARY NOTICE

1996 Annual General Meeting
Monday 21 October
3.00 pm
The Old Ship Hotel
Kings Road - Brighton

Formal notices will be sent to all Members and Representatives
on Friday 27 September 1996

National Society for Clean Air and Environmental Protection
136 North Street - Brighton BN1 1RG

The Size Fractionation and Ionic Composition of Airborne Particulates in the London Borough of Greenwich

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Imperial College
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This paper presents preliminary data on the size distribution of particulate matter and its ionic composition at an urban background location in London measured using an eight stage cascade impactor. The size distribution of the particulate matter was found to be generally bimodal, and the fine mass ($<2.1\ \mu\text{m}$) was found to dominate the PM_{10} fraction, accounting for 58% of the mass on average.

Weekly mean PM_{10} concentrations ranged from 20.2 to $39.3\ \mu\text{g m}^{-3}$.

Sulphate was found to dominate in the fine fraction, with maximum concentrations occurring in the submicron range. Weekly mean sulphate concentrations ranged from 4.1 to $10.9\ \mu\text{g m}^{-3}$. Nitrate and chloride, on the other hand, were found to dominate in the coarse mode, indicating different modes of formation in the atmosphere. Weekly mean nitrate and chloride concentrations were found to range from 1.0 to $3.0\ \mu\text{g m}^{-3}$ and 0.1 to $0.8\ \mu\text{g m}^{-3}$ respectively.

Comparisons made between mass concentrations obtained using the cascade impactor and a co-located real time PM_{10} analyser (TEOM) showed that the impactor consistently recorded higher concentrations, with the mean difference being $6.9\ \mu\text{g m}^{-3}$. The size of the difference appeared to be associated with the total mass concentration of fine particles, and it is suggested that the TEOM analyser may systematically underestimate concentrations in this range.

Introduction

Positive associations have been found between particulate concentrations, expressed as either PM_{10} or $\text{PM}_{2.5}$, and mortality and morbidity in recent US epidemiological studies (Pope *et al*, 1995). Correlations between particulates and mortality appear to be better using $\text{PM}_{2.5}$ and sulphate, indicating that the smaller particles, which are able to penetrate the alveoli, may be the primary cause of health effects observed. It is not known, however, at this stage whether it is the size, number or chemical composition of the particulate matter which is the critical parameter.

Despite the concern over particulate effects on health, there is still very little monitoring data in the UK which describes the size distribution of particulates in the urban environment, and the chemical speciation of particulate matter. Current particulate monitoring in London primarily consists of real time PM_{10} mass measurements through the use of the Tapered Element Oscillating Microbalance (TEOM) as utilised throughout the London Air Quality Network (LAQN) and the Department of Environment's (DOE) national network. These two networks do not, however, monitor different size fractions routinely, and at only a few LAQN sites is any chemical speciation work carried out. Sulphate is the only ion which has been routinely monitored as part of the Multi-Element in Particulate Survey (Carroll & McInnes, 1985).

Methodology

Sampling was carried out at an urban background location in the London Borough of Greenwich. The site was

adjacent to one of the LAQN's automatic monitoring stations in Eltham which provides real time monitoring data for sulphur dioxide, ozone, nitrogen dioxide and PM_{10} . This site was therefore ideal for conducting comparisons between mass measurements obtained using the cascade impactor and the TEOM, and for assessing the influence of air quality on particulate concentrations and speciation.

Particulates were sampled using an 8 stage Graseby Andersen cascade impactor, which operates at a flow rate of $28.3\ \text{l/min}$. Impactor stages ranged from an upper cut-off of $10\ \mu\text{m}$, down to $0.4\ \mu\text{m}$. The collection substrate used was quartz fibre in order to minimise artefact formation. Sampling was carried out over one week periods in order to obtain sufficient mass on each stage. Sampling was carried out over the summer from 9 June to 2 August 1995.

Filters were allowed to equilibrate in a designated weighing room for 24 hours before weighing in order to standardise for temperature and humidity. After equilibration, the filters were weighed on a 5 figure Sartorius R160P balance. Filters were again allowed to equilibrate for a further 24 hours after sampling. Three blanks were used for each sampling run.

The ionic composition of the particles was determined by sonicating each sample filter and blank in $15\ \text{ml}$ of distilled deionised water for 2 minutes and then centrifuging for 10 minutes. The sample solution was then analysed manually using a Dionix AutoIon™ System 12 Analyser for the determination of sulphate, nitrate and chloride. The mean of two injections was used in all sample calculations.

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Results

Mass Measurements

Table 1 shows the mass concentrations of PM₁₀, PM_{2.5} and PM_{1.1} collected over 6 weeks from 9 June to 2 August 1995. It can be clearly seen from the results that the fine fraction dominates the PM₁₀ mass concentration, with PM_{2.5} accounting for 58% of the total, and PM_{1.1} accounting for 48% of the total, on average. The percentage of mass in the fine fraction compares very well with recent data from Birmingham, where PM_{2.5} and PM₁₀ is being continuously monitored with TEOMs. Overall, the percentage of PM_{2.5} at the Birmingham site was found to average 60% (QUARG, 1996). The percentage of fine mass was also found to be seasonally dependent, with concentrations accounting for 67% of the PM₁₀ mass during the winter period (Oct-Mar), and 53% in the summer period (Apr-July) (Jones, pers comm).

Weekly concentrations of PM₁₀ were relatively low in the first three weeks, dropping to 20.2 µg m⁻³ by week 3. There was a significant rise in PM₁₀ levels in week 4, which carried on through until the end of the study in August. The increase in particulate concentrations coincided with a pollution episode across London, with high levels of ozone, nitrogen dioxide and sulphur dioxide recorded. Data obtained from the LAQN's monitoring station at Greenwich showed that air quality breached the DOE's "Poor" band at least once during each of the last three sampling periods. Most of the breaches were due to ozone, but in weeks 6 and 7 sulphur dioxide breached the "Poor" band, and on both occasions was associated with easterly winds. This would indicate that power stations and industry in the East Thames corridor were the cause of these elevated concentrations. Nitrogen dioxide exceeded the "Poor" band once, during week 7.

Data from week 5 is not available due to a leak which developed in one of the impactor seals towards the end of the sampling period, thus making an accurate measurement of mass concentration impossible.

TEOM results were obtained for the same sampling periods used during the impactor runs, and the mass concentrations compared. The impactor consistently showed higher mass concentrations than the TEOM, by an

average of 6.9 µg m⁻³, representing up to 50% in individual weeks. The difference in readings between the two instruments appeared to be correlated to the amount of fine mass recorded in that week, with a greater disparity occurring when the fine particle concentration was high. Figure 1 shows the difference between the readings obtained from the impactor and TEOM, plotted alongside the concentration of fine mass (PM_{2.5}) recorded in each week. There is clearly a correlation between the two parameters, indicating that the TEOM may consistently underestimate the concentration of particles in the fine fraction.

The mean size distribution of particulate mass for the 6 weeks is shown in Figure 2. The size distribution over the study period was generally bimodal, with the larger mode appearing in the 3.3-4.7 µm range, and the other in the submicron range. These findings are consistent with other data in the literature (e.g. Lundgren & Burton, 1995). Stage 2 filters (4.7-5.8 µm) were found not to have an even distribution of particulate matter, unlike all the other stages, which may have resulted in an underestimation of mass in this size range. This was not attributable to leaks in the impactor seals. The lower mass on stage 2 filters would explain why the size distribution of particulate matter is not as clearly bimodal as in other studies.

Ionic Composition

The mean concentrations of sulphate, nitrate and chloride measured over the sampling period are given in Table 2. The concentrations obtained were comparable with other urban measurements of ionic species in the UK (Harrison & Jones, 1995) with the exception of chloride which was marginally lower. Highest concentrations of sulphate were recorded in week 7, which coincided with the highest sulphur dioxide levels recorded at the LAQN Greenwich monitoring station. Highest concentrations of nitrate and chloride were observed during week 4, when a significant proportion of these ions were found in the fine fraction.

The mean size distribution of ionic species over the 6 weeks is shown in Figure 3. The size distribution of ionic species over the sampling period was relatively constant, with sulphate showing a unimodal distribution which peaked in the submicron range. Chloride and nitrate, on the

Table 1: Weekly Mass Concentrations (µg m⁻³) of PM₁₀, PM_{2.5} and PM_{1.1}

Week	Ending	PM ₁₀	PM _{2.5}	PM _{1.1}	TEOM PM ₁₀
1	15/06/95	26.5	14.7	11.4	19.9
2	22/06/95	22.6	12.6	10.2	17.6
3	29/06/95	20.2	9.1	7.3	19.9
4	06/07/95	39.3	25.9	22.6	26.1
6	26/07/95	34.7	17.9	15.3	23.8
7	02/08/95	35.7	23.2	19.8	30.2
Mean	15/06/95-02/08/95	29.8	17.2	14.4	22.9

ASTHMA AND AIR QUALITY

What Is Asthma?

Asthma is a disorder of the airways in which inflammation obstructs airflow and causes breathlessness and wheezing. It is becoming increasingly common throughout the developed world - in both urban and rural areas. Some of this increase may be due to difference in the way disease is diagnosed, but this alone does not account for the huge increase in prevalence of the disease. It is estimated that in the UK 1 in 10 children has asthma, and that 40% of the UK population will have suffered asthma symptoms at some time by the time they reach the age of thirty three.

Asthma is an allergic disease - where the body's immune system overreacts to a stimulus. To counteract the irritant or stimulus, the airways become inflamed and swollen and produce excess mucus, causing narrowing of the airway in susceptible individuals. The incidence of allergy, such as hayfever, allergic rhinitis (runny nose) and eczema is also increasing. It is commonly felt that air pollution, particularly from motor vehicles, is responsible for this increase.

What Causes Asthma?

No one has yet been able to identify a cause for the increasing number of asthma sufferers in the UK and the developed world. However it is certain that those with a family history of asthma or allergies such as hayfever are more likely to develop asthma. Also, children who suffer respiratory infection at an early age, such as pneumonia, whooping cough and bronchitis are more likely to develop asthma. However it is not clear whether they suffer these infections because of their asthmatic tendency or develop asthma because they have been subject to respiratory disease. Environmental factors which are known to trigger asthma are early exposure to tobacco smoke - whether from passive smoking in children or smoking as an adult and exposure to allergens. Occupational asthma is most common in those working with animals, isocyanates and in flour and grain milling. In the home furry pets and house dust mites can exacerbate asthmatic tendencies in sensitive individuals.

What Triggers Asthma?

If an individual has asthma, there are many factors that can trigger attacks - not all of them environmental. One survey found that the following were felt by parents of asthmatic children to trigger wheezing. In descending order of importance these are -

colds and infections; weather conditions; time of year; exercise;
excitement or upset; smoky air; pollens; furry animals (especially cats); house dust; air pollution; foods/additives

(Anderson, 1995)

Air Pollution

The nature of air pollution has changed over the past 40 years. Emissions of smoke and sulphur dioxide associated with smogs of the past have declined, while the proportion of pollution from vehicles has increased (see NSCA Factsheet *Air Quality Trends in the UK*).



Concentrations of all pollutants sometimes exceed EC and WHO guidelines. The guidelines are set at levels below which no significant health effects can be detected. However it is difficult to assess the effects of air pollution on the health of individuals in the population as personal exposure and response of individuals to pollutants varies widely. Other factors such as smoking, pet ownership and diet may influence the incidence of respiratory disease such as asthma. The following is a summary of the findings of current research into the effects of air pollutants on asthma.

Pollutant	Observed Effect on Asthma Sufferers
Allergens (tree and grass pollen)	Pollens can trigger an allergic response in the airways of susceptible asthmatics, causing inflammation and consequent narrowing. At high concentrations air pollutants can enhance the effect of some pollens. Air pollution may also affect the concentration of pollens.
Sulphur dioxide (SO ₂) (coal burning)	Causes narrowing of the airways of asthma sufferers, through the immune response of the airway to the irritant.
Nitrogen oxides (NOx) (vehicles and industry)	No significant effects have been found. In some cases increased response to allergens in asthma sufferers. Highest NOx exposures are in the home.
Ozone (O ₃) (formed from nitrogen oxides in sunlight)	Causes inflammation and consequent narrowing of the airways after short exposure and can increase response to irritants, exacerbating asthma symptoms.
Particles (diesel vehicles and coal burning)	It is suspected that PM ₁₀ can impair lung function, and that increased levels of particulate can affect asthma sufferers.
Air Pollution Episodes (periods of exceptionally high pollution levels)	Studies have shown that air pollution episodes cause increased asthma attacks and allergic disease in some people but not others. No connection has been found between major asthma episodes and elevated pollution. Similarly during serious pollution episodes consistent increases in asthma attacks have not been found.

(Information is a summary of recent epidemiological and volunteer studies)

Why is asthma increasing?

Asthma is increasing throughout the western world. Some of the reported increase may be due to better diagnosis, changes in the way disease is diagnosed and greater awareness. However the current escalation in cases is too great to be explained by diagnostic trends alone. Several factors have been put forward, common to our lifestyle, which may account for this increase:

Factor	Change
Allergy	Hayfever, rhinitis and eczema cases have increased.
Motor vehicle pollution	Asthma has increased in areas where there is little air pollution as well as in polluted areas. However some studies show a link - for example in Germany comparisons between East and West showed greater prevalence in the West which has a higher traffic density. In East Germany chronic respiratory disease is more common. Here smoke from coal burning is the main source of pollution.
Smoking	Smoking is increasing in women and decreasing in men.
Housing	Central heating, insulation and poor ventilation increase the house dust mite population. Increase in indoor exposure to chemicals from building materials, furnishings, household products. There is no marked increase in pet ownership, but indoor conditions, trapping and concentrating allergic irritants, have changed.
Diet	More processed foods consumed.
Hygiene	Disease is less common - the immune system rarely has to fight infection.
Immunisation	Children are increasingly vaccinated against disease.

(Anderson, 1995)



What is being done?

There is concern about the dramatic increase in incidence of asthma. It is estimated that 5% of the population are affected, costing the NHS £400 million per annum, and a similar amount is lost by the economy in lost productivity and sickness benefit.

In 1990 the Department of Health established the Committee on the Medical Aspects of Air Pollution (COMEAP) to look at air pollution and health. Reports published are listed at the end of this leaflet. The Expert Panel on Air Quality Standards (EPAQS) advises on air quality standards for the UK. However, while air pollution can trigger asthma, it has not been established as a cause. In order to be able to assess further the effect of air pollutants on health, accurate measurement of personal and population exposure to indoor and outdoor air pollution is necessary.

Further Reading

Ozone - Expert Panel on Air Quality Standards, HMSO, 1995

Particles - Expert Panel on Air Quality Standards, HMSO, 1995

Understanding Asthma - Institute for Environment and Health, University of Leicester, 1995

Clinical and Experimental Allergy - Volume 25, Supplement 3, November 1995

Asthma and Outdoor Air Pollution - Committee on the Medical Effects of Air Pollution, HMSO, 1995

Non-Biological Particles and Health - Committee on the Medical Effects of Air Pollution, HMSO, 1995

Further Information

National Asthma Campaign - Asthma Helpline 0345 010203

Air Quality Information Line - 0800 556677

National Society for Clean Air and Environmental Protection
136 North Street, Brighton BN1 1RG

Table 2: Overall Mean Concentrations and Range of Weekly Mean Concentrations of Anions

<i>Ionic species</i>	<i>Mean concentration ($\mu\text{g m}^{-3}$)</i>	<i>Range ($\mu\text{g m}^{-3}$)</i>
SO ₄ ⁻	6.8	4.1 - 10.9
NO ₃ ⁻	2.1	1.0 - 3.0
Cl ⁻	0.5	0.1 - 0.8

other hand, showed a unimodal distribution which peaked in the 3.3-4.7 μm range. There was one exception, in week 4, when both chloride and nitrate exhibited bimodal distributions, with the concentration in the fine fraction almost equalling that in the coarse fraction.

Discussion

Size Distribution of Particulate Mass and Ionic Species

The size distribution of particulate mass shows two modes, which is normally taken to indicate that there are two distinct sources of particles - the particles in the coarse fraction being generated by mechanical action, and those in the fine fraction being formed in the atmosphere due to gas to particle conversion, or being produced by vehicle emissions.

The occurrence of sulphate in the submicron range is consistent with the gas to particle conversion route whereby sulphuric acid is neutralised by ammonia to form an aerosol in the accumulation mode. Nitrate and chloride on the other hand are clearly generated by other means since they both occur in the coarse mode. The most obvious source of the chloride is sea salt, since the Thames estuary is only a few miles from the sampling location. The occurrence of nitrate in the coarse mode suggests that the nitrate is being formed through the reaction of nitric acid with the NaCl aerosol to form NaNO₃, with the subsequent dissociation of HCl. Nitrate formed through this reaction occurs in the coarse mode, and similar studies involving maritime air masses have found nitrate peaks in the same range (Harrison & Pio, 1983; Ottley & Harrison, 1992). In contrast, measurements in Leeds showed the majority of nitrate to be associated with the fine fraction (Willison *et al*, 1985). The reaction of HNO₃ with NaCl to form coarse nitrate might explain why concentrations of chloride found in this study were lower compared to those reported in the literature. It should also be noted that many of the speciation studies in the UK were carried out in coastal areas, and as such the chloride concentrations are likely to be higher in these areas due to the presence of marine chloride.

The measurements reported here also relate to summer conditions only, and the size distribution of these ions may differ in other seasons.

Differences in TEOM and Impactor Mass Measurements

The differences in PM₁₀ mass measurements obtained from

the TEOM and cascade impactor might be explained by inherent differences in the two instruments, such as flow rates, inlet design and means of filter equilibration. For example, the TEOM utilises the standard USEPA approved PM₁₀ head, whereas the cascade impactor is designed with only an approximate upper cut off of 10 μm . However, the differences in the mass measurements are quite significant, with the impactor reading up to 50% higher than the TEOM. Furthermore, the use of the USEPA PM₁₀ head on the TEOM would in fact lead to higher PM₁₀ concentrations compared to the impactor, not lower, since the PM10 head is omnidirectional and would therefore have a greater efficiency in higher wind speeds.

The most interesting point to note is that there appears to be an association between the difference in readings and the concentration of fine particulate matter recorded, but no such association when coarse mass is plotted against the difference in results. This would indicate that the difference in mass concentrations between the two samplers is particle size dependent, with the TEOM systematically underestimating the concentration of finer particles.

One possible explanation would be the heated inlet used on the TEOM, which is currently set to 50°C. This temperature is used to avoid the need for filter equilibration, since all moisture in the airstream will be removed. However, it is quite possible that, in addition to moisture removal, the heated airstream is also resulting in losses of the more volatile compounds present in the urban aerosol. Ammonium nitrate and ammonium chloride, for example, are extremely volatile at room temperature and could account for significant losses in the heated airstream. Concentrations of fine nitrate and chloride in this study were however too low in order to account for the differences in the measurements observed. It is possible though, that concentrations of fine nitrate and chloride were underestimated in this study, due to volatilisation of these ions from the filters as a result of the high temperatures and long sampling periods used throughout the study. Lower mass concentrations may also have been recorded by the TEOM due to the volatilisation of hydrocarbons. Recent Birmingham data shows organic carbon concentrations to be approximately 5 $\mu\text{g m}^{-3}$, or about 15% of the PM₁₀ mass (QUARG, 1996). Studies in the UK have shown that the majority of the carbonaceous matter is associated with the fine fraction (QUARG, 1993). Workers at the University of Leeds also recently found that the Graseby Andersen cascade impactor collected significantly more mass

compared to the TEOM, and that this was attributable to loss of volatile compounds by the TEOM (Clarke, pers comm).

Intercomparison exercises have been carried out in the US between the TEOM and the Hi-Vol sampler, with the Hi-Vol being the current USEPA reference PM_{10} method. The studies showed that differences of 45% in mass concentrations were observed between the reference method and the TEOM which utilises the standard 50°C inlet, with the TEOM producing the lower measurements (Meyer *et al*, 1992). Furthermore, when the inlet temperature was reduced to 30°C, the difference between the TEOM and the Hi-Vol was reduced to 30%. Other studies between co-located TEOMs, one with an inlet temperature at 50°C, and the other at 30°C, showed that the instrument with the lower inlet temperature resulted in mass concentrations which were more than double those of the standard 50°C TEOM (Meyer *et al*, 1995). The results of these studies would therefore indicate that inlet temperature has a significant effect on the mass concentration measured by the TEOM. There is however the possibility that the higher mass concentrations obtained with the cascade impactor are due to the effects of moisture becoming trapped on the filter during sampling. Since the TEOM is designed to remove any moisture from the air stream, this would obviously lead to differences in mass concentrations between the two samplers.

Concern has recently been expressed to the Quality of Urban Air Review Group about potential losses of volatile compounds through the use of the heated inlet on the TEOM (QUARG, 1996). Since the TEOM is the standard instrument used throughout the UK network it is important that the possibility of any systematic underestimation of mass concentration be the subject of additional research. An intercomparison exercise between various particulate samplers, including the TEOM, is currently being carried out by the National Environmental Technology Centre. This research will generate data which will provide further information regarding the accuracy of mass measurements made by the TEOM. In addition to this research, it would be useful to carry out speciation work on the TEOM filter, and filters collected through the Automatic Cartridge Collection Unit (ACCU). The ACCU utilises the by-pass flow of the TEOM, and since the airstream is not heated, provides an ideal opportunity to assess whether volatile compounds are being lost on the TEOM filter.

Conclusions

- Weekly concentrations of PM_{10} averaged $29.8 \mu g m^{-3}$ over a 6 week study period in June-July 1995. Fine particles dominated the PM_{10} fraction, with $PM_{2.5}$ accounting for 58%, and $PM_{1.1}$ accounting for 48% of the total on average.
- The size distribution of particulate matter was generally bimodal, with a mode in the 3-5 μm range, and a second larger mode in the submicron range.

- Significant discrepancies were observed between mass concentrations measured with the cascade impactor and TEOM, with the impactor concentrations being, on average, $6.9 \mu g m^{-3}$ higher.
- Weekly concentrations of SO_4^{2-} , NO_3^- and Cl^- were found to average 6.8, 2.1 and $0.5 \mu g m^{-3}$ on average.
- Sulphate was unimodal with a peak in the submicron fraction. Nitrate and chloride were also unimodal, but predominated in the coarse fraction, with a peak in the 3-5 μm range.

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The authors would like to thank the London Borough of Greenwich for supporting the project, which formed the basis of an MSc thesis for Imperial College. Thanks are due to the South East Institute of Public Health for providing data from the London Air Quality Network and to Dr. Steve Smith of King's College for allowing the use of an ion chromatograph for the chemical analyses. The authors also wish to thank Marcus Jones of the University of Birmingham for his useful comments on the paper.

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Figure 1: Association between Fine Particle Mass Concentration and Difference in TEOM Impactor Results

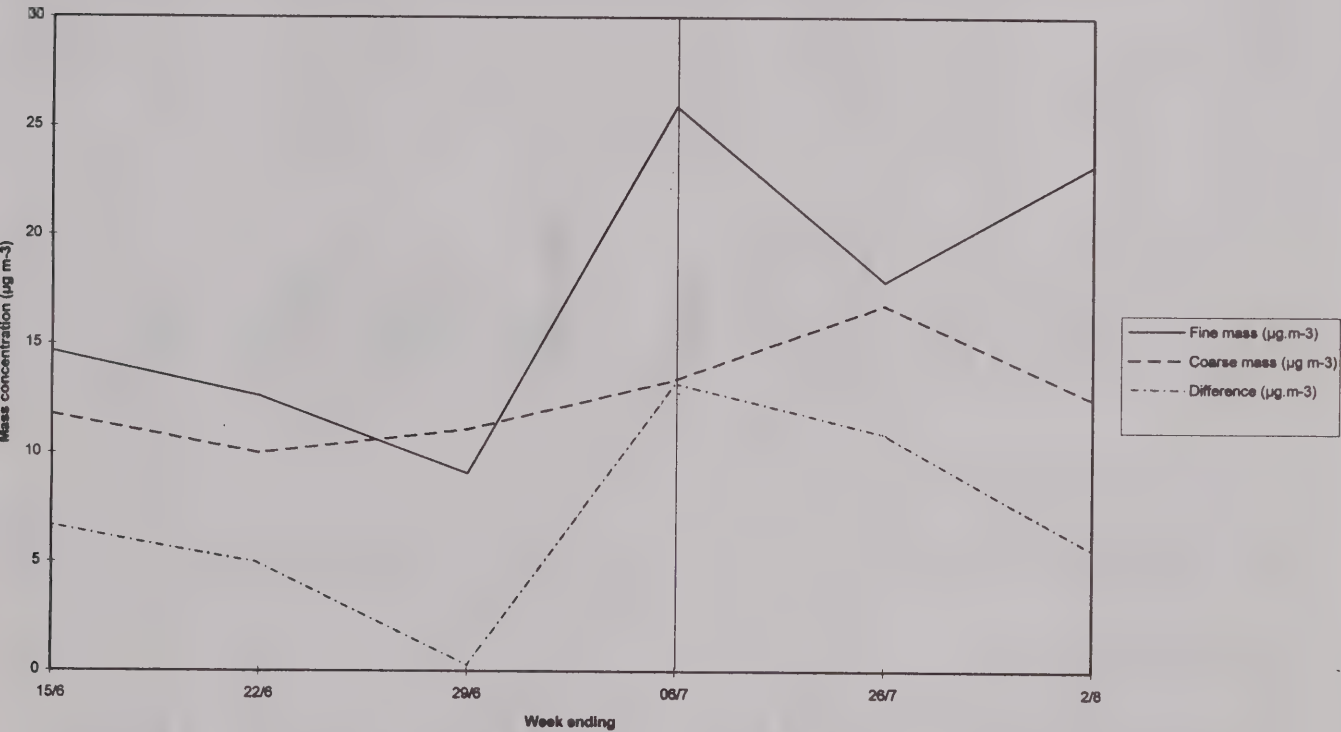


Figure 2: Mean Size Distribution of Particulate Mass

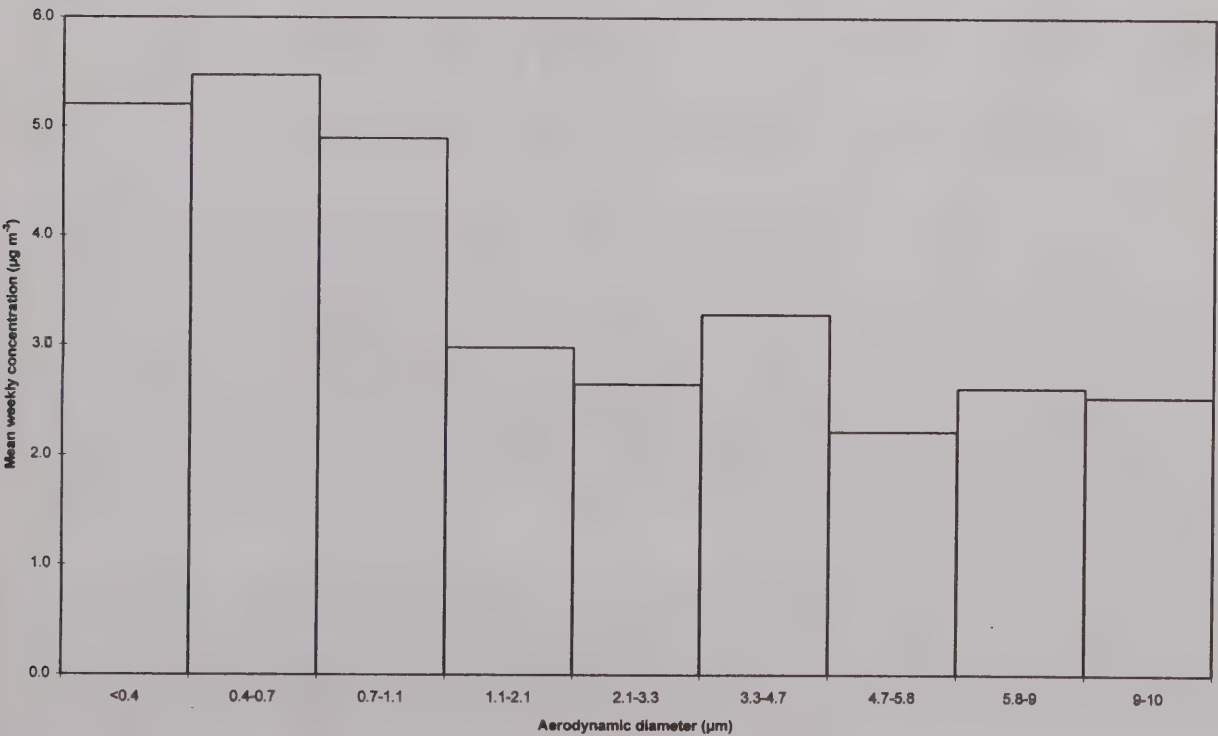
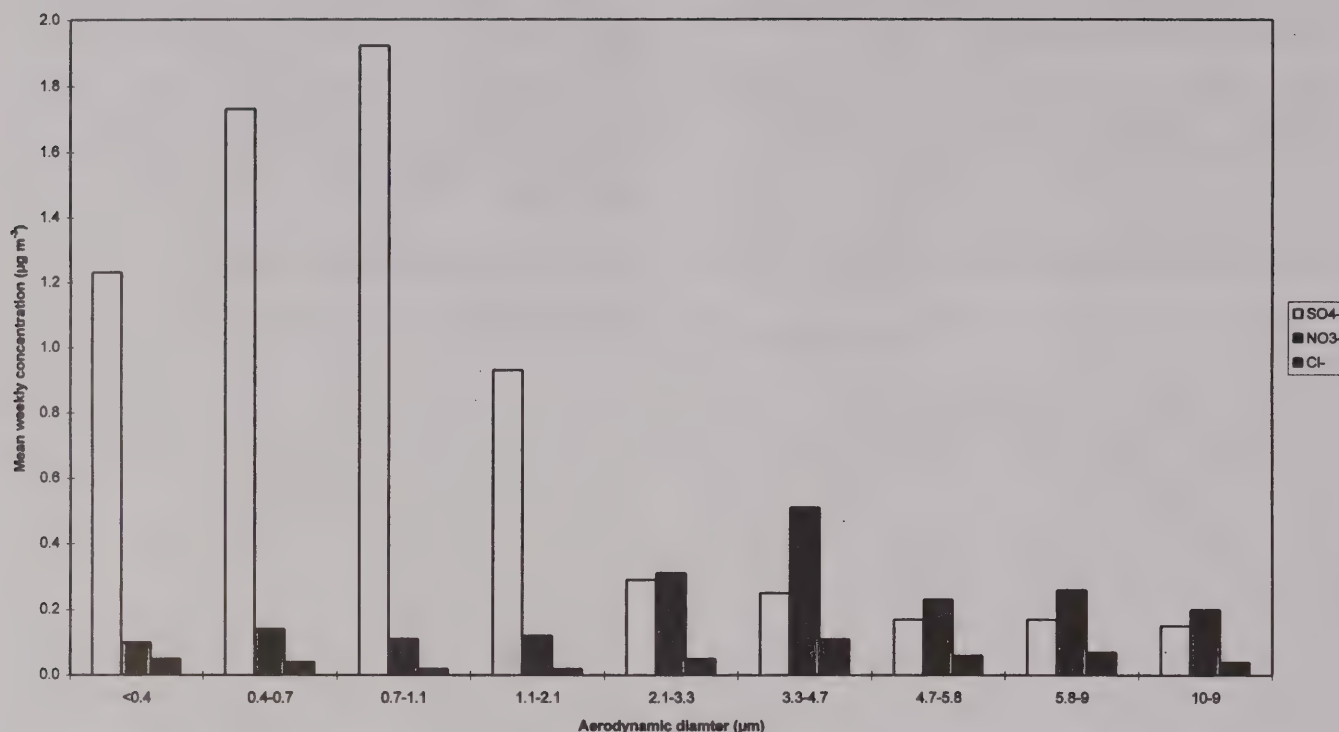


Figure 3: Mean Size Distribution of Ionic Species

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Environmental Management and Assessment Scheme Local Authority Experience - The Sutton Model

Bruce Cockrean
EMAS Coordinator, London Borough of Sutton

The London Borough of Sutton recently became the first local authority in the United Kingdom to gain EMAS accreditation under the adaptation of the Eco-Management and Audit Regulation for Local Authorities in the UK. This article outlines how this was achieved and the lessons learnt from the experience, and highlights how the issues related to air pollution are addressed by local authorities.

Sutton is one of 32 London Boroughs situated in the south west of the city, covering 4,300 Hectares with a population of 170,000 people. The Borough Council is a unitary authority with responsibility for both local and strategic functions. Employment is mainly in the service sector, with 4,500 firms being based in the Borough.

Background

An Environmental Policy adopted by the Council in 1986 created the focus for a wealth of environmental strategies and initiatives within the organisation and throughout the community. Much was achieved in the areas of nature conservation, recycling and environmental education, with many award winning schemes. The impetus for continued environmental improvement became increasingly hard to maintain - a plateau of environmental performance had been reached. The emergence of EMAS provided an effective new focus for environmental management within the authority. In March 1994 Sutton decided to seek registration for all its units by the year 2000 with the first eight units being verified by the end of 1995.

Air Pollution

The identification and control of air pollution forms a core issue in environmental management. EMAS identifies air pollution as both a direct and indirect or service effect.

The production of air pollution as a direct effect by local authorities may be less obvious than for the manufacturing, waste disposal and power generation industries but in many cases the local effect may be just as significant. This can be seen with examples such as incineration, building and construction work, district heating schemes, building management and crematoria.

Air pollution as an indirect effect is of particular importance to local authorities in respect of policy formulation and strategy, Planning and Environmental Health. The important role Environmental Health play in the control of air pollution meant that it was important to ensure that they were one of the first units to gain local authority EMAS in the UK.

Implementation

A unit by unit approach was the most applicable to a local authority the size of Sutton. The first eight units to gain validation were Waste Management, Environmental

Protection, Purchasing and Departmental Management, Architecture, Valuation, Building Services, Structural Engineering and the Policy and Administration function within the Chief Executive's Department.

Ownership was seen to be the key; everyone needed to understand and own their part in the environmental problems and solutions facing the Authority. This could only be achieved if each unit was given the training to develop their own systems and the strategic support to back the systems up wherever necessary. The ultimate aim would be systems driven by procedures which were no longer than one side of paper.

The systems were not developed by consultants or environmental coordinators but by the people who would have to use them. Project teams of four or five people from within the units were given training and worked with the EMAS coordinators to develop their own systems. The result is systems that are not unnecessarily technical or longwinded, and are achievable and work. Each team member contributed about an hour a week over a three month period to get their EMAS system up and running.

An ongoing series of half day, one day and two day training courses means that to date over 50 people across the organisation now have a good understanding of how to develop their own EMAS systems.

An Environmental Steering Group made up of officers at Assistant Director level and chaired by the Director of Environmental Services formed the basis of the Corporate overview and coordination system, and reported into the Committee structure. The group has a vital role to play with regard to environmental effects of concern but not in the control of individual units. This is especially true of strategic issues and direct effects which need to be dealt with on a site by site basis rather than by individual units.

Value was added to existing systems wherever possible to cut down on bureaucracy. The financial internal audit team were allocated the role of environmental internal

auditors to ensure that system control was maintained without becoming too burdensome.

Outcomes from the system included:

- environmentally sensitive use of materials and resources;
- environmental assessment of projects and plans;
- environmental assessment of budgets;
- development of environmental criteria for contract setting and monitoring and reduction targets for direct effects.

The result of implementing the discipline, target setting and performance monitoring of EMAS on a local authority culture unused to codified systems, was **that the right environmental questions were asked at the right time to the right person**. This meant that existing environmental initiatives were easier to maintain, and so energy could be put into new initiatives. **The plateau has been passed.**

The major outcome for the Environmental Protection unit was the further development of a more proactive approach to dealing with pollution issues. Objectives related to increasing public awareness of local air pollution levels, its causes and effects. Such an approach helps drive the Local Agenda 21 debate by informing and involving the local community to tackle the problems at source.

Weaknesses

The major weakness of EMAS within a local authority is one of image. Without suitable preparation EMAS can be perceived to be the worst of both worlds: as a management tool to highlight existing management weaknesses, and as an environmental tool to add a green gloss and increase workload. Whilst these fears are ill founded they are none the less very real for many local authority workers facing an uncertain future in the present financial climate. This perception is not helped by the guidance produced on local authority EMAS, which does not start from a point of acknowledging existing environmental good practice and control measures, and is often used to highlight only negative environmental effects without fully identifying positive effects.

Since the development of its environmental policy over ten years ago, the London Borough of Sutton has already undertaken a considerable amount of work on its direct environmental effects. This has meant that additional savings on direct effects have not so easily been found following the use of EMAS, though areas where existing schemes can be extended have been identified. I am sure that other authorities with less well developed environmental policies would have little difficulty in identifying cost savings as a result of using EMAS. Cost savings from service effects are not so obvious and need to be seen in the context of organisational efficiency, the right questions being asked by the right people at the right time.

This will result in maximum environmental gain from existing initiatives and areas of service delivery, and the identification of areas where limited resources can be put to best effect.

Deciding on which effects are significant is presently a weakness for many local authorities who have to steer a path between the vagaries of 'expert judgement' and the cumbersome risk assessment type models. This is especially true for service effects when the issues are not so well defined.

Costs will always be an issue; the present cost of verification may well be prohibitive to many smaller local authorities, and may be sufficient reason for many less keen local authorities not to develop EMAS at all.

Strengths

The great strength of EMAS is the focus on measurable, controllable improvement, and the fact that it highlights that everyone in an organisation has a contribution to make. This is especially true for local authorities, when initiatives are often set up without suitable controls and are allowed to drift when the 'green initiative' is thought up. Without the discipline of EMAS it can be hard to see if an initiative is succeeding and not just tying up staff time and resources.

EMAS works as an improvement led management system and not just as an environmental management system. This is a great strength for local authorities that have no experience of codified systems or those who have been left with a bitter taste from traditional quality systems where the emphasis is on uniformity.

The real strength of EMAS is that it allows people to feel good about themselves, as they can see their efforts are having measurable positive effect.

The most important lesson learnt as an EMAS coordinator is that you should not be too prescriptive. With the right training the project team approach allows people to develop management systems that drive real environmental change and provide real value to their service delivery. You don't need to be an expert.

The Future

EMAS comes at a time of great change for local authorities and provides a great tool for meeting many of the challenges ahead. But it is only a start. The brave new world for local authorities where they need to address the issues of Sustainability, Local Agenda 21, Business Planning, and Investing in People calls for an even more integrated approach if we are to avoid the pitfall of seeing these initiatives in isolation and not as part of a single management approach. The EMAS approach will I am sure develop into a *Sustainability Management System*, which will help to put local authorities at the front of the Sustainability and Local Agenda 21 debate where they belong.

UPDATE

QUARG ON PARTICLES

The latest report from the Quality of Urban Air Group (chaired by Professor Roy Harrison of Birmingham University) assesses the current data on airborne particles (including PM_{10}) and examines its implications for the control of particles in the UK's urban air. The report concludes that:

- the best information indicates that the major sources of primary particles (emitted directly from the source into the air) are road transport (25%), non-combustion processes (24%), industrial combustion plants and processes with combustion (17%), commercial and residential combustion plants (16%) and public power generation (15%);
- within urban areas generally, the influence of road traffic is marked; in Greater London an estimated 86% of PM_{10} emissions arose from this source;
- in summer, secondary particles (formed by the action of sunlight on emissions of sulphur and nitrogen compounds) appear to be the main cause of episodes of high PM_{10} concentration, although the contribution of resuspended road dust is also important. Numerical models predict that agreed controls on emissions of sulphur and nitrogen oxides across Western Europe will deliver an improvement of about 40% in average concentrations of secondary particles across the UK by 2010. This alone is not sufficient to bring summer concentrations in line with the EPAQS recommendation of $50 \mu g/m^3$ measured over a 24-hour running mean period;
- in winter the major contributor to episodes of high PM_{10} concentrations is exhaust emissions from road transport. A reduction of about two-thirds in emissions from this source would lead to achievement of the EPAQS recommendation at background sites in most UK urban areas;
- control of roadside concentrations and pollution episodes to meet the EPAQS recommendation would require further emissions reductions. For example to have limited 24 hour average PM_{10} concentrations to below $50 \mu g/m^3$ in the December 1991 episode in London is estimated to require a reduction of over 80% in road traffic exhaust emissions. Current projections indicate a cut in road transport emissions of about 52% by 2010.

The Government will be considering what further measures are needed to reduce emissions of particles from all sources in the course of preparing the National Air Quality Strategy; this is due to be published during the summer.

QUARG's report on airborne particles is available free from the QUARG Secretariat, Institute of Public and Environmental Health, University of Birmingham, Edgbaston, Birmingham B15 2TT; Fax: 0121-414 3709.

EC MINISTERS TACKLE AIR POLLUTION

EC Environment Ministers representing countries from North West Europe have agreed a range of measures to tackle air pollution, including a target to eliminate summertime smog by 2005. Other measures include:

- developing, in cooperation with the European Environment Agency, a new framework for collaboration on monitoring and forecasting episodes;
- harmonisation of public information on health effects;
- closer sharing of experience on the effectiveness of voluntary and regulatory measures, such as limiting car use when air pollution is poor;
- seeking to speed up EC measures for tighter exhaust limits;
- encouraging the EC and the UNECE to develop a pan-European ozone strategy.

HEALTH WARNINGS INADEQUATE

A new report published by the British Lung Foundation (BLF) reviews current Government health warnings on air pollution and recommends changes to enable people to be better informed about action to take during winter and summer smogs.

Air Quality: the Information We Need, by Dr. Simon Taggart, lung specialist at the Royal Free Hospital in London, also criticises UK guidelines on "safe" levels of air pollution and says that many people with lung problems are wheezing and breathless under these limits. The current system of air pollution banding may also confuse and alarm the public since quite small changes in levels of air pollution suddenly move the Government definition of air quality from "good" to "poor".

The BLF are recommending that the two current categories of "very good" and "good" be replaced by "satisfactory". Long term air quality forecasts should also be issued when there is a likelihood of sustained poor air

quality; this would allow people with asthma and other lung diseases to plan ahead and adjust their medication if necessary.

The report also says that there is an urgent need to measure and publish data on the minute particles (PM₁₀) from diesel vehicle exhausts. The report stresses that this is the most “dangerous” air pollutant - high levels are linked with premature deaths in young and old people and increased chest symptoms in children.

RADON AFFECTED AREAS

The National Radiological Protection Board (NRPB) has completed a detailed mapping exercise of England to identify those areas most affected by radon.

The NRPB study confirms that throughout the country, 80% of the homes most likely to be affected by high levels of radon are situated in Cornwall, Devon, Somerset, Northamptonshire and Derbyshire. Completion of the mapping exercise has identified a number of new areas where more than 1% of homes are expected to be above the Government’s “Action Level” of 200 Becquerels per cubic metre of air.

The newly identified affected areas are: Avon, Cumbria, Dorset, Gloucestershire, Leicestershire, Lincolnshire, Northumberland, North Yorkshire, Nottinghamshire, Oxfordshire, Shropshire, Staffordshire and Wiltshire. Approximately 100,000 homes in these areas are likely to have high radon levels and in June invitations were sent to these homes offering a free radon measurement. If the results show high levels of radon, the NRPB can provide householders with advice on the solutions available.

ENVIRONMENTAL TECHNOLOGY INDUSTRY

Laxity and uncertainty in British regulation is resulting in the environmental technology industry being left without the long term goals it needs to justify investment in R&D and without a firm home market from which to launch its exports. Investment in pollution control R&D is deterred further by the lack of fiscal incentives to industry and low level Government investment in R&D. In contrast, Germany, Japan and the UK provide very substantial R&D funds and tax incentives. Consequently Germany owns 29% of the world’s patents in environmental technologies, compared to the UK with just 6%.

These are the key findings of a major international report by Brunel University *Barriers to Investment by the Environmental Technology Industry in Research and Development*, commissioned and published by The Environmental Industries Commission (EIC),

The Report recommends that the Government:

- develop a comprehensive timetable for environmental improvement and related menu of new environmental technology improvements needed to secure better

environmental quality at least price. The Environment Agency should drive a “UK environmental improvement programme” with an up-front timetable of regulatory changes, which is properly enforced.

- focus R&D funding on the gaps in environmental technology (as identified in the proposed environmental improvement programme), and particularly encourage the development of clean technologies.
- provide financial incentives to industry to renew ageing assets with plant which both complies with future standards and is business efficient.
- provide funding for environmental technology R&D at a level that is in line with the UK’s major competitors.

The EIC’s report is available price £35.00, from the EIC, tel: 0171 624 2728.

SUSTAINABLE DEVELOPMENT

A recent report from the Institution of Civil Engineers strongly urges all political parties to “get their act together” on environmental planning.

The report, *Sustainability and Acceptability in Infrastructure Development* is the ICE’s response to Environment Secretary, John Gummer, who challenged the ICE to take the lead in setting up a dialogue within its industry (but involving others) to tackle the question of how to make infrastructure development sustainable and acceptable to the public. Part I of the report addresses issues of principle and suggests an overall philosophy for moving towards sustainability and acceptability. Part II reviews different categories of infrastructure - roads, railways, airports, energy generation, water supply, drainage and effluent treatment, maritime, waste disposal and land reclamation - with more specific ideas for sustainability and acceptability.

The report says that in the long term there must be changes in the way people conduct their lives; however, hopes for bringing about change through long term fiscal and regulatory programmes will remain elusive if issues such as taxation continue to be political footballs.

The ICE calls upon the political parties to work together in producing and implementing a national policy for sustainable development. Specific initiatives that the report recommends include:

- a serious attack on the “lone highwayman” in his company car;
- the adoption of pollution licences;
- development of a Queen’s Award for the Sustainable Environment, with a special section on the provision of sustainable infrastructure;
- greater urban regeneration through the recycling of “brown field” sites, with taxation measures to bring this about;

- more initiatives in re-creating natural environments which are threatened by otherwise beneficial development.

Copies of the report are available price £20.00 from the Sales Department, Thomas Telford Publishing, Thomas Telford Services Ltd, 1 Heron Quay, London E14 4JD. Incidentally, any reader who finds the report boring may reclaim the purchase price, providing

- they have read the first 20 pages of the report;
- they make a minimum of two clear proposals, not included in the report, for measures that respond to the challenge of sustainability and acceptability in infrastructure;
- they can provide evidence that they paid for the report and return it in good condition within 14 days.

CFC SMUGGLING THREATENS OZONE LAYER

The growth of smuggling in CFCs is threatening the success of the Montreal Protocol - CFCs are now the second most lucrative commodity smuggled through Miami - according to Duncan Brack, author of *International Trade and the Montreal Protocol*, which is published by the Royal Institute of International Affairs.

Established to control the production and consumption of CFCs and other ozone depleting chemicals, the Montreal Protocol also places restrictions on international trade in the interests of the global environment - a feature which may become common in future treaties. The trade provisions were essential, the paper argues, in order to

- create the wide international support the Protocol has achieved, and
- keep industries from moving to non-Protocol countries to escape controls.

The trade restrictions, however, potentially violate the non-discrimination principles of the General Agreement on Tariffs and Trade (GATT). The possibility of a legal challenge under GATT undermines the credibility of the ozone regime, and inhibits the negotiation of similar restrictions in future treaties. *International Trade and the Montreal Protocol* therefore argues for amendment of GATT to remove the possibility of such challenges.

International Trade and the Montreal Protocol, £12.95, is published by the Royal Institute of International Affairs and Earthscan.

ENVIRONMENT AGENCY PUBLICATIONS

Enforcement Code

The Environment Agency has published a Code of Practice on its enforcement of environmental protection law. The Code comprises an enforcement policy statement, an enforcement guide for Warranted Officers of the Agency and a guide to the rights and appeal procedures of

businesses and individuals subject to enforcement action. The Code will also be of interest to others who have an interest in the enforcement of the *Environment Act 1995* and those other Acts and statutory provisions (listed in the Code) which the Agency enforces.

The principles of enforcement which have been adopted by the Environment Agency are:

- **proportionality** - enforcement action taken by the Agency should be proportionate to any risks posed to the environment and to the seriousness of any breach of the law or relevant licence or consent.
- **consistency** - in advice given, the use of powers, decisions on whether to prosecute and in response to pollution incidents.
- **targeting** - making sure that enforcement action is directed primarily towards those whose activities give rise to the most serious environmental damage or pollution, or where the hazards are least well controlled.
- **transparency** - helping those subject to enforcement action to understand what is expected of them and what they should expect from the Agency.

Warranted Officers will have duties to assist, advise and inform businesses and individuals in understanding legal requirements, the obligations these impose and the specific environmental concerns in their locality. The Officers will also have duties to encourage good environmental practice and be sensitive to the needs of business including its requirements for prompt response.

The Code does not affect Warranted Officers' powers and duties to take immediate action where justified by the environmental risk. However, where there is no immediate environmental risk the business or individual will have 10 working days following notice from the Warranted Officer of the intention to take enforcement action to make representations to the Warranted Officer's manager if it is thought that the requirements should be changed or the enforcement notice should not be issued.

Copies of the Code are available from John Grayson, Environment Agency, Room P3/039, 2 Marsham Street, London SW1P 3EB, Tel: 0171-276 5097; Fax: 0171-276 4972.

Customer Charter

The Environment Agency has also published its *Customer Charter*; this sets out its key operating principles and identifies the levels of service it is trying to achieve, including response times for dealing with applications etc for environmental licences and requests for information under the *Access to Environmental Information Regulations*. The Booklet also sets out the Agency's sphere of responsibility, as well as summarising those areas of environmental protection for which it is not responsible. The Agency's policy on openness is also set out, as well as

how its registers can be accessed and the charges which will apply.

Copies of the Charter can be obtained from the Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS12 4UD; Fax: 01454 624009. A Welsh bilingual version is also available and copies are also available on tape, larger print and in Braille. The Charter can also be supplied in other languages - telephone 01454 624400 for details.

Comments on the Agency's standards of service set out in the Charter can be made until 30 August 1996; these will then be taken into account when revising and improving delivery of services.

Information Available to the Public

This Guide lists the registers and other information held by the Environment Agency to which the public have a right of access. It outlines where the Registers etc can be seen, the procedure for gaining access and charges which will be made where copies of information are required.

Details of the Agency's public registers, along with other corporate information, including the *State of the Environment* Report can be found on the Internet at <http://www.environment-agency.gov.uk>.

Further copies of the *Guide to Information Available to the Public* are available from local offices of the Agency or from the Environment Agency, Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol BS12 4UD; Fax: 01454 624009.

(NB Note change in address from Rivers House to Rio House.)

REVISED PG NOTES

Six more revised guidance notes on standards for air pollution control for Part B processes were published in early May and are available from HMSO:

- PG 3/8(96)
Quarry processes
- PG 3/15(96)
Mineral drying and roadstone coating processes
- PG 3/16(96)
Mobile crushing and screening processes
- PG 6/9(96)
Manufacture of coating powder
- PG 6/31(96)
Powder coating, including sheradising
- PG 6/35(96)
Metal and other thermal spraying processes.

SMOKE CONTROL

Seven more fireplaces have been exempted, subject to conditions concerning installation, operation and maintenance and fuels which can be burned, from the provisions of section 20 of the *Clean Air Act 1993*; this prohibits smoke emissions in smoke control areas. The exempted fireplaces are:

- The Dovre woodstove models 500G and 700G
- The Farm 2000 boiler models BB154, BB154A and BB154/2
- The Farm 2000 model HT6, HT6PLUS, HT600, HT7 and HT8
- The Jotul catalyst stove models 8TDIC and 12TDIC
- The RanHeat appliances models MSU150, MSU300, MSU500, WA150, WA300 and WA500
- The Talbott's combustion unit models, C1, C2, C3 and C4
- The Talbott's Heating models T75, T150, T300, D250B, D500B and D700B.

Full details of the exempted fireplaces and conditions applying are given in the *Smoke Control Areas (Exempted Fireplaces) Order 1996* (SI 1996 No. 1108). This Order also amends the 1991 Order (SI 2892) to permit cardboard to be burnt on Talbott's Warm Air Heaters Down Firing Range models D250, D500 and D700.

Schedule 1 to the *Smoke Control Areas (Authorised Fuels) Regulations 1991* is amended by 1996 Amendment Regulations (SI 1996 No. 1145), to authorise the following additional fuels:

- Blue Flame briquettes
- Cwm Coke Doubles
- Homefire Ovals (R)
- Homefire (Improved) briquettes
- Natura briquettes
- Redcar Coke Nuts (Doubles)
- Supacite briquettes
- Supertherm II briquettes.

Full specifications for the newly authorised fuels and their manufacturers are given in SI 1145. This also amends the 1991 Regulations to note that Clean Flame Briquettes and New Taybrite Briquettes are now manufactured by NSM Mining (South Wales) Limited.

MEMBERS' NEWS

At the recent AGM of the **South East Division** members heard from Lindsey Taylor of the National Asthma Campaign on the latest developments in the fight against asthma. Members also put their minds to the opportunities offered by the Millennium development in Greenwich. One possibility would be to involve local schools in monitoring the environmental management of contractors working on the exhibition site, culminating in a conference and display at the event itself. Also on a youth theme, the Division is planning to organise a sponsored event involving young people in raising awareness about air quality. Information from (and ideas to...) Simon Hickmott 01273 481000. The Division is organising a seminar in conjunction with the **South East Institute of Public Health** called *The Environment Agency - Partnership with Local Authorities* in London on 22 November, featuring a keynote speech from Ed Gallagher. Further details from Nicole Murray at SEIPH 01892 515153 or NSCA Divisional Secretary Joe Beagle 0181 452 0203. Future Divisional meetings will be held on 6 November and 12 February 1997.

Members of the **West Midlands Division** were able to try out electric cars first hand at a recent divisional meeting held at the Peugeot plant in Coventry. Divisional Chairman Bill Hancox is shown at the wheel of a modified electric Peugeot 106. These are now being used in trials in La Rochelle in France. Although impressed by the cars' performance (0-30 in 8.3 seconds), members were less impressed with the range (45 miles) and the likely price tag (over £13K). Low running costs are offset by the cost of leasing battery packs, but Peugeot believe there will be a niche in the "second car" market. "Most of my constituents haven't got first cars..." observed one elected member! The West Midlands Divisional AGM is on 4 July.

The **Northern Ireland Division** AGM took place in Carrickfergus BC offices on 16 May. Alderman J Rooney

was re-elected Chairman. Mr Dan Kennedy of **Belfast CC** (now of Ballymena BC) presented research into the extent to which neighbour perceptions of odour nuisance from aircraft operations at Belfast City Airport could be confirmed by objective measurement. Discussion following the presentation highlighted the spread of environmental initiatives in the Province. Developments like the Northern Ireland Group for Energy Efficiency in Transport and the WWF - NI Environment Link Local Agenda 21 Project underline the need for the Society to work in partnership with others. To this end the Branch Chairman, his deputy, the Honorary Secretary and the Secretary General visited the Director of Environmental Protection, Environment and Heritage Service to explore opportunities for collaboration. A number of interesting ideas emerged which are now being pursued.

Recent meetings of the **South West Division** have featured a presentation by Steven Holmes on dioxins (including a case study on the Coalite case), a trip to the Coal Technology Development Division to look at gasification systems (hosted by Peter Sage), and a visit to a major quarry to see how the industry is meeting its obligations under the EPA 1990.

A number of NSCA Divisions have put forward nominations for membership of the Environment Agency's Regional Environmental Protection Advisory Committees. Appointed so far: John Rice of **SEIPH** to the Thames region REPAC and Alan Higgins of **Portsmouth City Council** to the Southern region.

The **Centre for Exploitation of Science and Technology (CEST)** has been awarded the **Norsk Hydro Award** for Water Quality Improvement after helping companies save up to £4.2M in the Aire and Calder waste minimisation project. Developed with March Consulting, and with support from **HMIP, NRA, Yorkshire Water** and the BOC Foundation, the project has identified 671 options for reducing waste and reductions in water use of between 10-25% have been achieved.

The **Met Office** is joining forces with WS Atkins Consultants Ltd to offer a consultancy package on assessment and control of air pollution, odour and noise. The main aim is to combine meteorological and environmental expertise in projects which could range from international pollution studies to local traffic planning programmes. Met Office air quality specialists Doug Middleton and Malcolm Lee gave an expert presentation to the NSCA Spring Workshop on the crucial influence of local meteorology in pollution dispersion - see this issue of *Clean Air*.



Another year, another name-change for **TBV Science** who have now become **Stanger Science and Environment**. SSE can trace their NSCA membership back to the days when they were the scientific services department of the Greater London Council. Their latest report for the DOE is on air pollution in underground car parks. It suggests that although individual users of car parks are unlikely to be exposed to pollution levels above recommended limits, car park attendants may be at risk from the combined effects of pollutants.

Full marks to **East Sussex County Council** for the travel arrangements for their recent environment conference. The programme was timed to fit around local bus and train schedules, and a full timetable was provided. For delegates travelling by car, reserved parking was only provided for those offering lifts, with their contact phone numbers shown on the advance delegates list. The organic Sussex produce buffet was pretty good too! The conference saw the announcement of a Sussex-wide air quality working group comprising all districts and the two county councils. A contract to compile an emissions inventory has been awarded to **Consultants in Environmental Sciences Ltd**.

NSCA was responsible for coordinating UK activities in support of International Noise Awareness Day, thanks to some financial help from the DOE. **Middlesbrough Borough Council** and **Cannock Chase Council** were two of many NSCA local authority members who participated. Our photos show Cannock's Cllr Ken Walker with EHO John Ness and Health Promotion Officer Jan Mitchell, whilst Middlesbrough EHO Jeff Gray monitors a contestant in a "Loudest Shout" local schools competition.



Elsewhere...

Many people tell us that the NSCA Conference is the highlight of the environmental protection year - and if you have been to one you will know why! We are particularly looking forward to seeing members at **Environmental Protection 96** on our home patch, Brighton. NSCA is proud of its reputation for delivering a first-class conference programme with an exhibition and social events to match. But be warned - this year we coincide with



another major conference, and Brighton's notoriously limited bedspace could be at a premium. Our advice is to register early and book your hotel as soon as possible. Information about accommodation will be sent out to all delegates when they register.

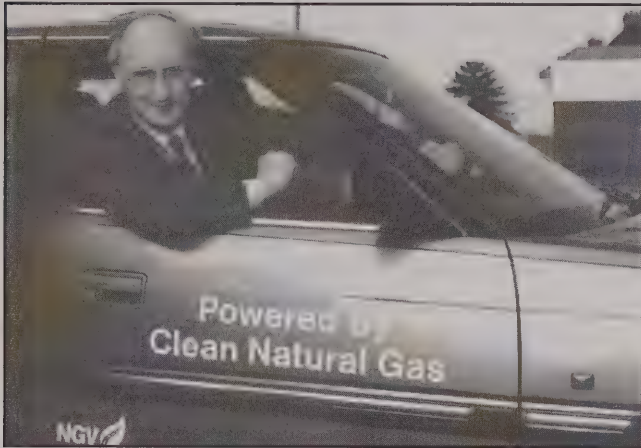
Also on the conference trail, the recent **ADC/AMA Environmental Health Conference** in Weston-super-Mare attracted over 200 delegates. It clearly induced schizophrenia in the ADC's Brian Etheridge who is currently on loan to the DOE. As the DOE speaker at a morning workshop on air quality management he observed "I wondered what sort of idiot would organise a workshop on the morning after the conference dinner. Then I realised it was me".

Dr Alan Marples is the new Director of **Business in the Environment**, the not-for-profit organisation which helps companies improve their environmental performance. This follows the departure of Noel Morrin, who takes over as head of **NETCEN**. A number of NSCA Divisions have been forging links with regional offices of BiE, and we hope these will continue to develop in the future.

Thank you to readers who responded to our competition to provide a caption for the new Environment Agency logo. Sadly, they were too rude to print! The same sort of humour would doubtless resurface if we were to invite captions for the pictures (below) of two Transport Ministers driving gas-powered vehicles.



Transport Minister **Steven Norris**, seen here at the wheel of **Rugby Borough Council's** CNG-engined refuse truck, is the keynote speaker at the NSCA/BRS seminar on alternative transport fuels. Also pictured leaning out of a Rover 827 modified by **British Gas NGV** is the Transport Secretary **Sir George Young**. Sadly we have lost the photo of **Michael Meacher** driving a CNG-fuelled van during his days as shadow Transport spokesman, which would have provided political balance.



The Noise Bill, which gave MPs an opportunity to rehearse endless anecdotes about constituency noise problems, has now passed to the House of Lords where the perspective is rather different. Environment spokesman Lord Lucas explained that the Bill's permitted noise level would be set to exclude intermittent noise. "As the owner of three peacocks, seven guinea fowl and a couple of dozen bantams, I am grateful for that fact", he added.

Our thanks to David Romaine of Derby City Council for supplying the following conundrum, which he was planning to use in a public information campaign on air quality:

The Arithmetic of Air Pollution

$1 + 1 = _$ (if you share a car)

$1 + 40 = _$ (if you use the bus)

$1 = 0$ (if you walk or cycle)

No prizes for providing the correct answer!

Finally, emissions trading in the US, first applied to large combustion plant, is now being extended to "smog credits" for **lawnmowers**. According to the *Financial Times*, the South Coast Air Quality Management District Authority has calculated that a mower used for 20 hours produces as much pollution as a new car driven 26,000 miles. This unlikely statistic makes one wonder exactly how big American lawnmowers are. Apparently the 1.7 million petrol-driven garden appliances in Los Angeles produce 22 tons of VOCs a day - serious enough for the agency to offer smog credits. Retailers can give customers trade-in discounts for petrol mowers and leaf blowers, and recover the money by scrapping the offending machines. Credits earned can be traded on the open market. The FT describes the enforcement agency as the "LA Smog Police". Sounds like the ideal subject for a new TV drama series.

BOOKS & REPORTS

The Environmental Guide to Pollution Control Technology. Caldicott Morgan, 1996. £195.00, ISBN 09542410X.

Aimed at managers with little or no experience in environmental control, this guide provides clear steps towards choosing the appropriate technologies for emission, discharge and waste problems. Each control technology is given a full page explanation and colour illustration. Information on performance and power consumption are included. It is prefaced by a brief overview of current legislation, and lists equipment suppliers. Unfortunately, it does not cover the *Environment Act* or the Agency, and a listing of regulatory authorities would have been useful.

The Asbestos Hazards Handbook: A guide to safety at work, in the community and in the home. London Hazards Centre, 1996. £12.00, ISBN 0948974133.

Primarily aimed at workplace and community groups, this handbook highlights the hazards of asbestos in the workplace, public buildings and publicly owned homes. It uses case studies to illustrate the potential health threat in all areas. Legislation and the responsibilities of asbestos removal contractors are detailed, with a useful list of contacts and enforcement agencies. It recommends asbestos removal, rather than sealing in all cases - and uses cases of seals failing and fires to illustrate this point. The handbook provides an excellent overview of the asbestos issue. It would, however, have been helpful to include guidance on action the private home owner can take, if asbestos is suspected to be present.

Sustainability: A Systems Approach. A.M. Clayton, N.J. Radcliffe, Earthscan, 1996. £15.95, ISBN 1853833193.

This book introduces the concept of a systems approach to the ecological and socio economic systems that make up our world. It argues that the transition to a more sustainable way of life means adopting a systems perspective - in which problems and solutions are multi dimensional, dynamic and evolving, rather than seeking straightforward solutions. It explains how regulatory and fiscal reform needs to be combined with a new decision making framework to achieve this. The authors are based at the Institute for Policy Analysis and Development, Edinburgh, which was established to promote research and development of policy options on sustainable ways of living.

Directory of Emissions Monitoring 1996. Department of Fuel and Energy, University of Leeds, Leeds University Press, 1996. £12.00, ISBN 0853161722.

The stated aim of this directory is to provide a list of companies active in the industrial emissions monitoring field. It gives a brief explanation of monitoring techniques and favoured methods, and lists 64 companies.

Smog Alert - Managing Urban Air Quality. D. Elsom, Earthscan, 1996. £14.95, ISBN 1853831921.

Poor urban air quality poses a health risk to 1.6 billion people. This book examines the threat posed by urban air pollution around the world. Chapters examine risks, pollutants involved, air quality management, alert systems, emissions controls and management and case studies. It provides an accessible introduction to the issues surrounding urban air quality for undergraduates and indeed anyone else interested in the subject.

The Future of Nuclear Power in Europe. D. Kurtz, Financial Times Publishing, 1996. £285.00, ISBN 1853344486.

This report is intended to provide an overview of key trends and issues in the nuclear industry in Europe and its prospects for the future. It gives an introduction to the industry and an examination of current and future technologies and current capabilities and trends. It then examines in detail economic, political and environmental aspects of nuclear power, and factors which will affect the development of the industry over the next 25 years. Analysis of each country and a review of the activities of major companies in the field are also included.

Europe's Environment: The Dobbris Assessment. Ed D. Stanners, P. Bourdeau. European Environment Agency 1996. ECU 55, ISBN 9282654095.

Covering 46 countries, the report uses data from a range of sources to give a detailed overview of the state of the environment in Europe. Divided into six parts, it sets out the context of the report, the assessment of each medium, pressures on the environment, the human activities that impact on the environment, problems and conclusions. Filling nearly 700 pages, and extensively illustrated, the assessment provides data on all aspects of the European environment.

FORTHCOMING NSCA EVENTS

Monday 21 - Thursday 24 October
Environmental Protection 96
NSCA's 63rd Annual Conference
Brighton

Tuesday 26 November
Waste Management
Training Seminar
NEC, Birmingham

Tuesday 11 February 1997
Training Seminar
NEC, Birmingham

Tuesday 15 and Wednesday 16 April 1997
NSCA's Annual Spring Workshop
Abingdon, Oxfordshire

For further details please contact
National Society for Clean Air and Environmental Protection
136 North Street - Brighton BN1 1RG

Tel: 01273 326313

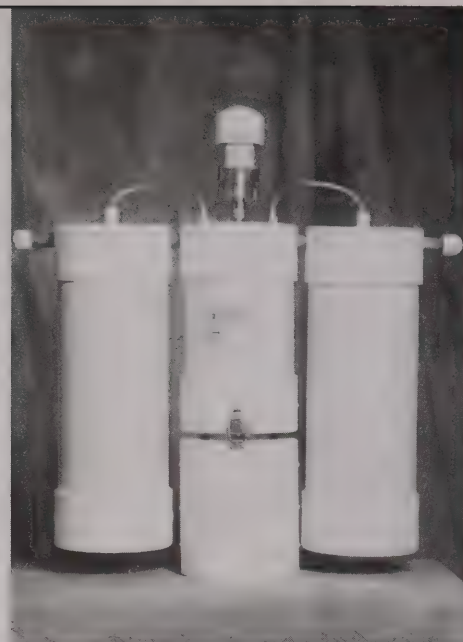
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AUTUMN/WINTER 1996

- NSCA Annual Report 1995-96
- An Empirical Function for the Ratio $\text{NO}_2:\text{NO}_x$
- Medical Thresholds or Quality of Life Assessments

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Editorial Note

This issue of *Clean Air* - numbered 3/4, Autumn-Winter 1996 - is the final issue of Volume 26. As from 1997 (Volume 27), *Clean Air* is to be published six times a year. The first issue (January-February 1997) will be published in mid-December 1996.

The National Society for Clean Air and Environmental Protection produces information, organises conferences and training events, and campaigns on air pollution, noise and environmental protection issues. Founded in 1899, the Society's work on smoke control led to the Clean Air Acts. More recently NSCA has been influential in developing thinking on integrated pollution control, noise legislation, and air quality management.

NSCA's membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Individual membership is also available to environmental specialists within industry, local authorities, central government, technical, academic and institutional bodies.

Members benefit from joining a unique network of individuals who share an interest in a realistic approach to environmental protection policy; from access to up-to-date and relevant information; from reduced fees at NSCA conferences and training events. They contribute to NSCA's regional and national activities; to environmental policy development; to translating policy into practice; to the Society's wide-ranging educational programmes.

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EDITORIAL

The True Costs of Road Transport

Few issues are more fundamental to the present transport debate than the relative costs and benefits of road transport. Given the wildly differing world views of many of the protagonists, it is highly unlikely that this is a question upon which a consensus will ever be reached, even if the magnitude of the uncertainties involved could be reduced.

Informed attempts to make explicit the true costs and benefits of road transport can, however, do much to illuminate the underlying problems and choices with which we are faced. They can provide valuable signposts on the road to a sustainable transport system.

With the publication of *Blueprint 5: The True Costs of Road Transport* (Maddison & Pearce et al, 1996) Professor David Pearce and his colleagues have done just that. Their headline estimate, of £45.9-52.9 bn for the [marginal] external cost of UK road transport for 1993, will be hotly disputed. As no doubt will the claim that air pollution from road transport kills more people than traffic accidents. None the less the book's central conclusion - that there are "many journeys for which the private benefits are outweighed by the wider costs to society" - will clearly find widespread support.

Blueprint 5's attempt to quantify the health impacts of air pollution from road transport is particularly useful in drawing attention to the magnitude of the economic costs involved (an estimated £19.7bn for 1993). Breaking this figure down by pollutant, fuel and vehicle type assists in providing a basis for the development of policy.

Emissions of NO_x are identified as the most economically damaging, being implicated in both PM₁₀ and ozone formation, as well as resulting in adverse health impacts in their own right. The external health costs of diesel compare extremely poorly with both leaded and unleaded petrol (£0.84/l cf. £0.43 & £0.09/l respectively), although the initial estimate for 'city diesel' (£0.33/l) is roughly equivalent to that for leaded petrol.

However, disaggregating by vehicle type suggests that the external health cost/litre of fuel for diesel cars is broadly similar to that for leaded petrol cars. Buses and coaches, however, inflict health costs of a staggering £1.32/l - a figure which is likely to be significantly exceeded for the 28% of the UK bus fleet which pre-dates 1980. It is therefore argued that tax incentives for bus operators to retro-fit particulate traps and use 'city diesel' would provide one particularly effective means of reducing traffic pollution. This is just one of a host of fiscal measures - from area licensing to linking vehicle purchase and ownership taxes to emissions - for which *Blueprint 5* makes a convincing economic case.

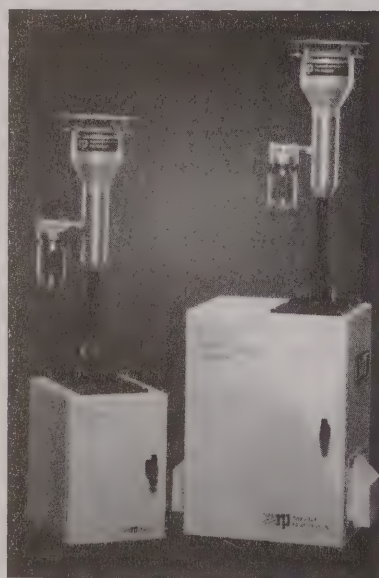
Indeed, the authors' keen advocacy of market-based solutions to traffic problems should make this book essential reading for the Chancellor in the run up to November's budget. This is after all a Government which claims to be committed to making transport users pay their full social and environmental costs. Even if it has to date, with a few notable exceptions such as the differential duty in favour of unleaded petrol, shown itself remarkably reluctant to use fiscal measures to obtain transport related environmental gains.

Clearly this must change. The problems of air pollution, noise, loss of environmental amenity and congestion presently associated with road transport are simply not sustainable. By themselves, however, fiscal measures are unlikely to be sufficient. That is why the Society also supports measures such as the *Road Traffic Reduction Bill* aimed at promoting alternatives to car use, reducing the need to travel through planning policy and promoting new communications systems.

Finally, a note of caution - cost/benefit analysis can be a double-edged sword. It tells us little about issues of equity and justice. Furthermore, it is far from clear that the valuation techniques presently available actually price externalities at a rate which would lead to a sustainable outcome, even under conditions of apparent social efficiency. The language of economics must therefore be supplemented by that of legal rights and entitlements if we are to safeguard the health of our citizens, the environment and future generations.

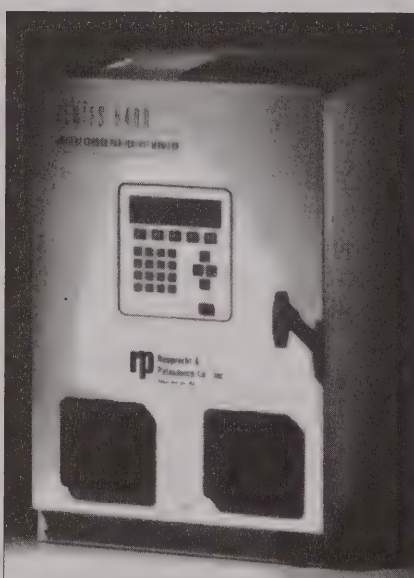
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REPORTS

An Empirical Function for the Ratio $\text{NO}_2:\text{NO}_x$

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This article describes the use of a simple empirical function for the ratio of NO_2 to NO_x . By way of example the procedure as it applies to a simple dispersion model, a box model, which assumes a balance between the rate of pollutant emission and its rate of removal by the wind from the edge of the city is considered.

Introduction

Air quality forecasts are issued every day as part of the Air Quality Bulletin System on behalf of the Air and Environmental Quality Division of the Department of the Environment. The likely concentrations of pollution are calculated a day in advance at the Met Office. They are then sent to NETCEN AEA Technology to be evaluated in the light of monitoring experience and banded into recognised categories. The bandings, such as "Poor" when the hourly mean concentration of nitrogen dioxide is expected in the range 100 to 299 ppb, describe the likely air quality in a shorthand form suitable for use in the media.

Air quality standards are expressed in terms of nitrogen dioxide (NO_2) because it is more closely related to perceived health effects than the total oxides of nitrogen (NO_x). The relative amounts of nitric oxide (NO) and nitrogen dioxide (NO_2) may vary, but their sum $\text{NO}_x = \text{NO} + \text{NO}_2$ is assumed to be conserved. In an urban area the NO_x may be diluted, but not lost from the system; i.e. dry deposition by adsorption to the ground or wet deposition in precipitation are slow and can be neglected when forecasting local NO_x . Air quality forecasts therefore calculate the concentrations of NO_x from which the concentrations of NO_2 must be derived.

Starting with Oxides of Nitrogen (NO_x)

Emissions of NO_x are expressed in their equivalent mass of NO_2 as if all the oxides of nitrogen are in the form of NO_2 (kilotonnes) per unit area (e.g. per 10 km by 10 km Ordnance Survey grid square) per unit time (e.g. per year). In the box model the units for the emissions rate Q are converted to obtain q expressed as $\mu\text{g m}^{-2} \text{s}^{-1}$ where $q = 3.171 \times 10^{-4} Q$. For a slice of the city area that is d m wide

across wind, and which extends x m downwind (this may be the size of the city), the NO_x emissions will be obtained as $qxd \mu\text{g NO}_2 \text{m}^{-2} \text{s}^{-1}$. From Figure 1, vertical mixing is from the ground up to a height h m, the wind speed is u m s^{-1} , and as before, d m is the cross-wind width of the slice of the city being modelled. The volume of atmosphere into which this emission is mixed per unit time is given by hud . The dilution volume depends on meteorological conditions through h and u . Note that d could be just 1 m, but its value is immaterial because d vanishes in the arithmetic; it is present whilst deriving the box formula for the purposes of keeping the dimensions consistent. We write the concentration of NO_x as $c \mu\text{g m}^{-3}$. The rate at which the mass of NO_x is removed from the city by the wind is $hucd$, and this equals the rate of emission from the same slice, namely qxd . Setting the rates equal, cancelling the common factor d , and rearranging gives the simple box formula

$$c = (q x)/(hu)$$

A conversion factor X is used to convert the units of concentration c from $\mu\text{g m}^{-3}$ into ppb. The reader will note that just as we expressed emissions data for NO_x in terms of mass of NO_2 , so we must invoke the molecular weight of NO_2 when converting the NO_x concentration into ppb. The conversion depends on the molecular weight W of the compound and the absolute temperature T_0 and pressure p :

$$X = 22.41 \times 1013.25 \times T_0 / (273.15 \times p \times W)$$

Then $X = 0.487$ for NO_2 where $W = 46 \text{ kg kmole}^{-1}$, temperature $T_0 = 273.15 \text{ K}$, and pressure $p = 1013.25 \text{ mbar}$. QUARG (1993) has a convenient table of values for X and its inverse $1/X$. Once the NO_x concentration $X c$ is found in ppb, we can use the following empirical function for the ratio of NO_2 to NO_x .

Estimating Nitrogen Dioxide (NO₂)

Let hourly mean concentration be denoted by square brackets. Concentrations [NO], [NO₂] and [NO_x] were measured by M Goldstone and J Lester of Imperial College, from 20/5/1991 to 30/6/1992, and analysed in Derwent et al (1995). The following expression has been fitted to these data, see Figure 2. Concentrations in Equations 3 to 6 are in ppb. The function gives [NO₂] according to:

$$[\text{NO}_2] = 2.166 - [\text{NO}_x] (1.236 - 3.348 A_{10} + 1.933 A_{10}^2 - 0.326 A_{10}^3)$$

where

$$A_{10} = \log_{10} ([\text{NO}_x])$$

Then the ratio *R* is

$$R = [\text{NO}_2] / [\text{NO}_x]$$

By definition of NO_x as total oxides of nitrogen, we have:

$$[\text{NO}] = [\text{NO}_x] - [\text{NO}_2]$$

Tests showed that the function applies in the range 9.0 ppb to 1141.5 ppb of NO_x and the following restrictions apply:

1. Below 9.0 ppb of NO_x, the ratio *R* is limited to 0.723. This avoids spurious negative values which the above polynomial will generate when near to the origin. It represents most of the NO having been oxidised to NO₂ after large dilution and significant reaction have occurred.
2. Above 1141.5 ppb of NO_x, the ratio *R* is limited to 0.25. This is the region which spans three orders of magnitude, extending to high concentrations characteristic of tailpipe concentrations. The shape of the curve in this region is open to debate, for there are few data here. The forecast NO_x concentrations are usually in the range 10 ppb to 1500 ppb, so *R* ranges from 0.73 to 0.25 respectively; the smallest value of *R* in this range is *R* = 0.1327 at [NO_x] between 470 ppb and 486 ppb.

This function is used to subdivide the forecasts for [NO_x] into [NO₂] and [NO]. The non-linear character of the function means that it is important for the [NO_x] to be correct if the [NO] and [NO₂] are to be reasonably accurate.

A Nomogram for the NO_x System

The function appears in Figure 3. Concentrations of NO₂ were plotted vertically (top of Figure 3) against those of NO_x horizontally. Subtracting NO₂ from NO_x, the concentration of NO was plotted downwards (bottom of Figure 3). At any NO_x concentration, the amounts of NO₂ and NO can be read from the curves. If we consider an imaginary parcel of air containing oxides of nitrogen, two processes can alter the concentrations in the parcel:

1. The mixture may be diluted, without chemical reaction, in which case the NO₂ and the NO concentrations must

remain in constant proportion to each other and to the total NO_x. This would give us a straight line from the starting NO₂ concentration to the origin (i.e. constant [NO₂]:[NO_x]), and a straight line from the starting NO concentration which would also pass through the origin (i.e. constant [NO]:[NO_x]). If parts of such a plot for a parcel containing these gases are straight lines for NO₂ and NO passing through the origin, then the dominant process is just dilution.

2. If chemical reaction takes place, it alters the relative proportions of NO₂ and NO in the parcel. Then the parts of the plot where this occurs will not point to the origin, but will be curved; to change from one line with a particular slope through the origin to another requires chemical reaction i.e. only reaction can vary [NO₂]:[NO_x] and [NO]:[NO_x]. The curved nature of the lines in the nomogram reflect the role of chemistry in changing the yield of NO₂ as the mixture is diluted.

This diagram was constructed from pollution measurements taken throughout the year at a fixed monitor, and shows the behaviour of many air parcels. A special experiment might be imagined to follow the curves for a single parcel. Such a Lagrangian measurement is difficult in practice though as it requires chemical analyses at positions along the many turbulent paths of the mixture. Nevertheless in the absence of other information these curves give a useful and quick guide to the behaviour of the NO_x system in an urban atmosphere over a range of meteorological conditions.

Summary

In forecasting air quality, it is necessary to start from the rate of mass emissions of NO_x (expressed as NO₂), to apply a dispersion model (we used a box model for illustration), and then to convert the mass based concentration of NO_x from µg m⁻³ to a volume based concentration in ppb. An empirical function then estimates the concentration of NO₂ (ppb) from the value for NO_x (ppb). Similar considerations apply in environmental impact assessments, especially near roads where NO_x and NO concentrations may be high but NO₂ production is restricted by the depletion of O₃. Middleton (1996) has applied the function to NO₂ near roads showing the importance of including background NO_x before reviewing NO₂ impacts in urban areas.

Acknowledgement

This note describes work that was funded by the Department of the Environment, Air and Environment Quality Division under DOE Contract Number EPG 1/3/06. We are grateful for the encouragement and support received during the work.

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Figure 1: Diagram of a Box Model

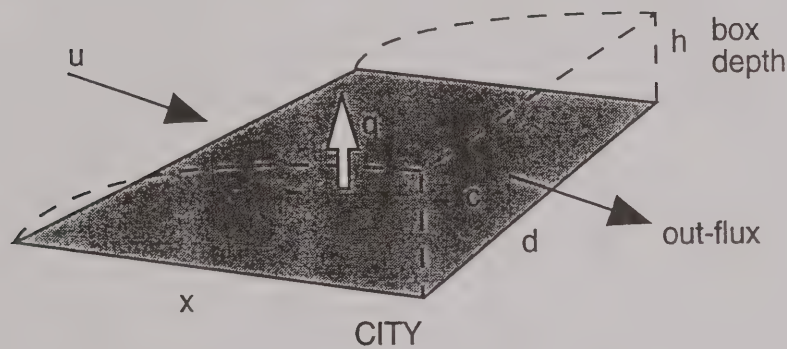


Figure 2: Curve fit to the measurements of the average hourly mean concentration of NO₂ observed for each hourly mean concentration of NO_x in Exhibition Road, London, for the period 1991-2. Concentrations are hourly averages in ppb.

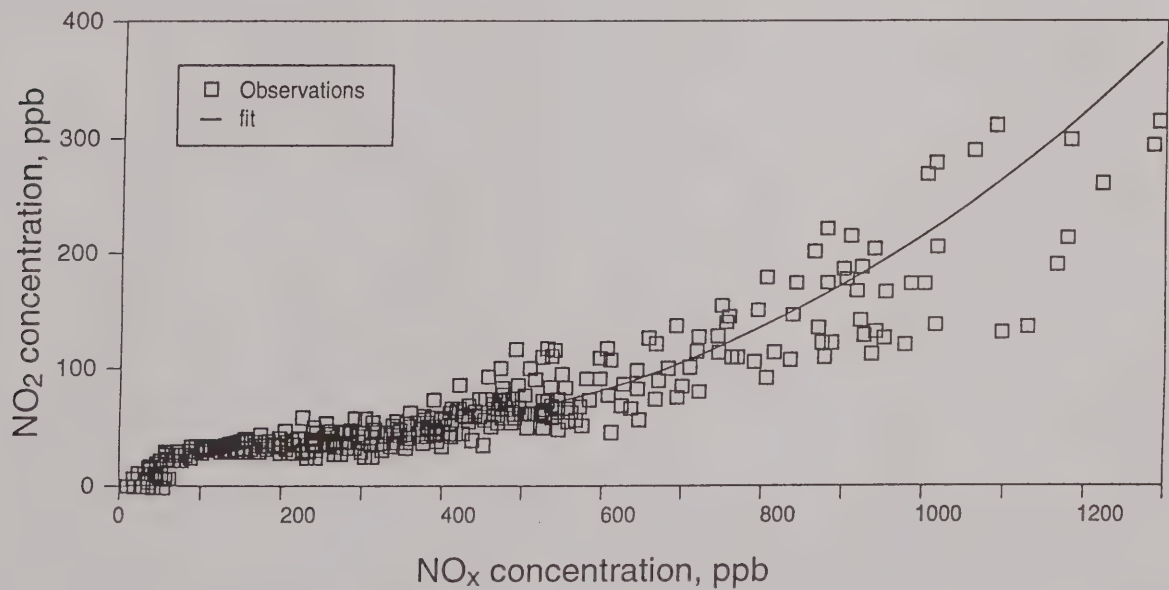
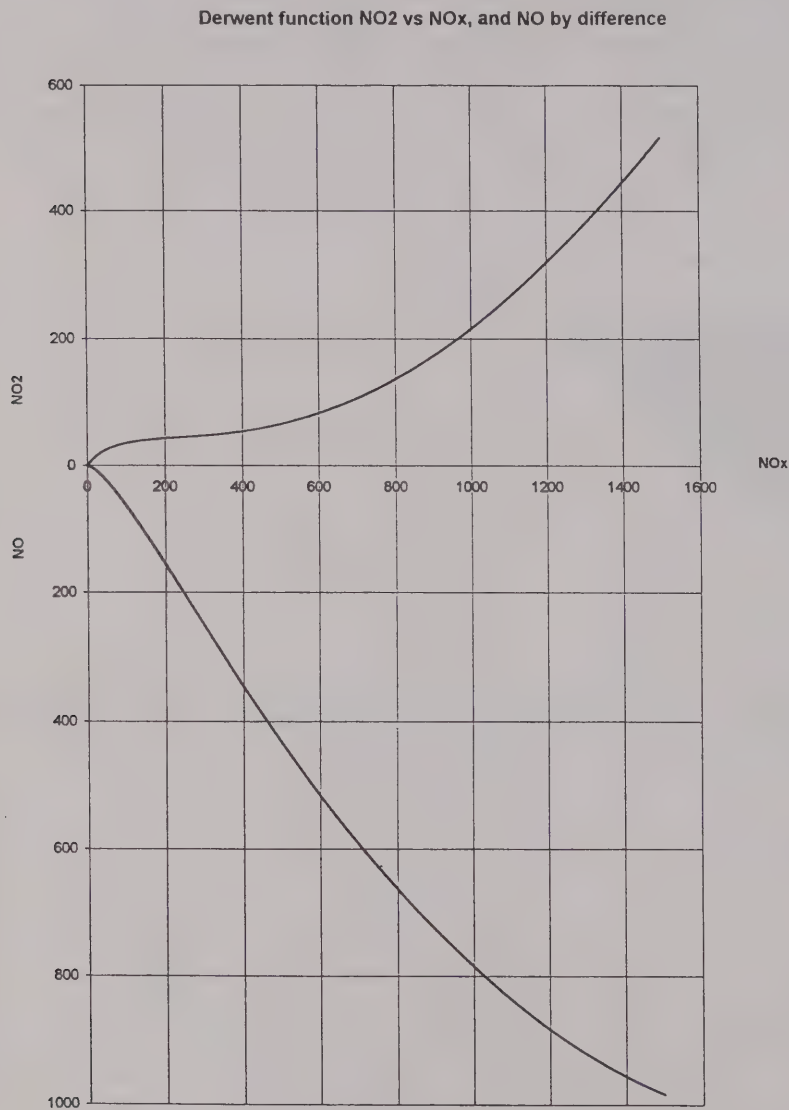


Figure 3: A nomogram for the contributions of NO_2 and NO to total NO_x in an urban atmosphere; concentrations are hourly mean values in ppb. The top curve indicates the likely maximum hourly mean nitrogen dioxide concentration that is expected; the lower curve shows the likely corresponding nitric oxide concentration.

**CORRECTION**

Clean Air, Vol. 26, No. 2, Summer 1996, page 28:
Please note that the EPAQS recommended standard
for carbon monoxide is 10 ppm (and not 10 ppb, as
printed).

Medical Thresholds or Quality of Life Assessments?

Adrian Davis

Health and Transport Research Group
School of Health and Social Welfare, The Open University

"The central core of the Government's air quality strategy is to seek, wherever realistically practicable, to achieve health based air quality targets" (DOE, 1995)

Introduction

Until the late 1980s the relationship between transport and health was focused almost solely on readily quantifiable effects. The landmark Buchanan Report (Ministry of Transport, 1963) discussed three links. Most prominent was road traffic fatalities and injuries because of the many thousands of lives lost or lives permanently impaired. Secondly, noise pollution, partly because it is measurable but also because some effects are tangible, e.g. lost sleep. Thirdly, air pollution which, although the Report noted that "engine fumes do not yet rank as a major cause of atmospheric pollution," did refer to the carcinogenic properties of 'fumes' and also smog causing 'eye and throat irritants'.

While all three continue to be of concern a recent analysis of the British Social Attitudes Survey suggests that road traffic generated air pollution is much more of a concern than noise (Stokes and Taylor, 1995). Mirroring this is the increasing attention being paid to links between lung function impairment and motor traffic emissions. There is now a growing consensus that the alarming rise in child asthma is related to the ability of emissions to lower 'tolerance thresholds'. In particular in recent years PM₁₀ (and smaller), associated with diesel, has heightened concerns that such pollution may cause cancers and premature deaths. The Committee on the Medical Effects of Air Pollution has, for example, concluded that while there is no evidence that healthy individuals are likely to be affected by levels of particles found in ambient air there is evidence of associations between levels of UK particles and effects on a number of indicators of damage to health. It notes that:

"people with pre-existing respiratory and/or cardiac disorders would be expected to be at most risk of acute effects from exposure to particles. The effects range from changes in lung function through increased symptoms and days of restricted activity to hospital admission and premature mortality" (DOE, 1995).

In a number of studies correlations between neighbourhood traffic volumes and child respiratory symptoms have also been reported by researchers, including hospital admissions for asthma (Wjst, 1993; Walters, 1994). Walters notes that:

"recent evidence has convincingly shown that death rates from heart and lung disease are up to 37% higher in cities with high levels of fine particulates". (p. 11)

In terms of costs the "best" estimate for mortality and morbidity of UK urban air pollution comes to £3.9 billion a year. This is an estimate of health costs only, as affecting the 12.2 million people in cities studied by the Department of the Environment. As the transport sector is responsible for approximately 60% of urban air pollution this gives £2.3bn as transport's share of the total cost estimate, around 0.38% of GDP (Tinch, 1995). Health based, that is medically defined, air quality targets are therefore understandably viewed as important within any air quality strategy.

Within a broader strategy for improving health it is important to consider air quality from a less quantitative perspective. The Government's Health of the Nation strategy for health has the overall goal of securing improvements in the general health of the population of England by **adding years to life** and **adding life to years**. Despite a strong focus on quantified targets, it seeks to achieve the latter by:

"increasing years lived free from ill-health, reducing or minimising the adverse effects of illness and disability, promoting healthy lifestyles, physical and social environments and, overall, *improving quality of life*". [author's emphasis] (2.1)

Moreover, the Health of the Nation recognises that these concepts are not new but an integral part of the World Health Organisation's (WHO) Healthy Cities and Health for All (HFA) approach. This places greater emphasis on a social and ecological model of health rather than on the bio-medical. It has had some influence at local authority level in many UK towns and cities. Such an approach is more able to incorporate public perceptions, including those on air quality issues, than quantitative assessments. This may be helpful as public perceptions, and arising from them public demands for action, can influence policy. Such perceptions may fall within the murky category of 'quality of life'.

Quality of Life and Public Opinion

Recent reviews of quality of life note the continued lack of consensus about its measurement. This is not aided by its being a social construct and so not directly observable. While this paper does not attempt to unravel the detailed debate about quality of life definitions a basic concept, despite shortfalls, would help to inform what follows. The central thrust of environmental quality of life can be conceived of as pertaining to the provision of the 'necessary conditions for happiness and satisfaction'. Culyer's conceptualisation of quality of life (in Rogerson, 1995) draws a distinction between external conditions or things (material life) and internal, personal factors of people (personal life). It illustrates a simplified relationship between three identified conceptions of environmental quality of life: living conditions; personal values; and experience. These include psychological wellbeing.

A poll by Social and Community Research showed that 48% of those surveyed felt that air pollution caused by motor vehicles was 'extremely' or 'very' dangerous to the environment and 40% that it was dangerous to their families (quoted by Hickmott, 1995). Public support for stricter controls on vehicle emissions polls high at 87%. A parallel trend is the perception that environmental quality is getting worse (DOE, 1994a). Recent in-depth public opinion research for the Department of Transport has also identified air pollution as an important issue of concern, especially the effects on the health of children and the elderly:

"When you go into [the] town centre you can taste the fumes... you see these little babies in buggies and you see these exhaust fumes". (University of Westminster, 1996)

Environmental quality is an important aspect of quality of life, and air pollution is a likely contributor to such perceptions and trends. It is not illogical to associate such concerns with changing lifestyle aspirations. The perception of poor air quality is implicated in the trend of a declining urban population. An NOP poll for Mintel (1992) found that two-thirds of urban dwellers polled would rather live in the country, with 10% planning to move and another 20% wishing to but financially restrained from doing so. In this context it is questionable whether or not the designation of areas with pollution problems as 'air quality management areas' might result in blighting parts of urban areas. Such areas are already likely to suffer from other problems.

Case Study

Some recent research, albeit from social democratic Copenhagen, may help to illustrate the point more clearly vis-a-vis air quality.

In 1993 Copenhagen Healthy City, an official World Health Organisation backed project, invited the citizens to make proposals for initiatives to improve the health

situation in the city. Three quarters of those who responded pointed to air pollution from motor traffic and the need to reduce car use. In contrast, there was a clear desire to promote cycling and public transport. The head of the Municipality's Environmental Protection Agency stressed the importance of perception and feelings of health and wellbeing, stating that:

"people feel that the air pollution is the main problem. Maybe it is also due to when you have been outside Copenhagen and you enter the city and you smell the air pollution and that tells everybody that there is something in the air". (quoted in Davis, 1995)

As the Healthy City project survey showed, people perceive traffic to adversely affect their health and quality of life even if road accidents and air pollution levels are low when judged against other cities or by medically evaluated thresholds. This point is unlikely to be lost on many British traffic engineers and planners who have confronted angry residents fearful of traffic injuries but where, to date, no injuries have been recorded. Indeed, this particular issue has sparked off a whole debate within the road safety field and led to the establishment, by road safety officers, of the Road Danger Reduction Forum.

The need to address public perceptions in Copenhagen comes from political concerns that the decline in the city's population in recent years has meant the loss of 'good' tax payers, as wealthier residents move out to the surrounding countryside for cleaner air and better living conditions. This has led the Municipality to take several courses of action. Firstly, the Environmental Protection Agency has begun public information campaigns to inform people about air quality using categories of low, medium, slightly raised, high, and very high levels of pollutants. This is to demonstrate that it is possible to live in Copenhagen and breathe fresh air. Secondly, and perhaps more significantly, the Roads Department has begun to incorporate the importance of qualitative issues, as well as the quantitative, into its thinking. Eir, from the City's Roads Department, notes that traditional environmental policy is preoccupied with objective measures such as noise and air pollution because it is much more difficult to prove the direct link between traffic and health although the public belief is that such a link clearly exists. This is not necessarily a drawback. Eir says that:

"The public interest in these matters may be a drive for change in traffic policy even if it is difficult to calculate the effects clearly."

Air Quality, Quality of Life and Transport Policy in the UK

The Expert Panel on Air Quality Standards has recommended a standard of $50\mu\text{g}/\text{m}^3$ of PM_{10} as a running 24 hour average. Yet, as the DOE notes:



Annual Report 1995/96

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CHAIRMAN'S FOREWORD



Chairmanship of Council is an honour which carries responsibility to reflect Council's views externally, stimulate development of Council's ideas, and ensure that its plans are implemented promptly and effectively.

In discharging these responsibilities I have taken the view that the Society's activities should be increasingly guided by the need to contribute to **sustainable development**. This principle has two important consequences:

- that we need to seek to **integrate** environmental protection into the wider processes of the economy and society, and
- that we need to strike the right balance between short, medium and long term measures. So far as the last is concerned we need to pay special attention to understanding and informing the views of **youth**.

My predecessor, Cllr. Dr. John R.P. Evans, led the Society to significant achievements, and many exciting initiatives were in hand both nationally and in the Divisions when I took over from him last October. This report gives a snapshot of some of these, and access to detail on others. In carrying them forward and embarking upon new ventures Council seeks to draw on the strength of its membership to ensure that its actions are based upon sound science and realistic appreciation of social and economic opportunities and constraints.

The approach of the Society's centenary, shortly followed by the Millennium, is providing a good opportunity to take stock. The need for this has been emphasised by recent changes among the membership, particularly the local authorities, but also within industry. The Council has therefore put in progress a thorough re-examination of the Society's objectives and structures and of the ways in which it both receives support from, and provides support to, its Divisions. In anticipation of the outcome of this review and in order to provide an increased level of support to members, changes to the staffing structure have been initiated.

It is a testament to the strength of commitment of our President and Vice-Presidents, Honorary Officers and Members that the Society is held in high regard as a source of objective views and appropriate plans for action. For all their wisdom and effort I am most grateful.

George Barrett
Chairman
29 July 1996

INTRODUCTION

The Society promotes transition to a sustainable economy by an integrated approach to the protection and improvement of environmental quality, having regard to social priorities and to economic opportunities and constraints. It achieves these ends by building consensus among individuals from industry and commerce, the professions, government, the academic community and other non-governmental organisations on:

- standards and objectives for environmental quality and loading for protecting health and biodiversity;
- the state of the environment;
- strategies for avoiding or reducing adverse pressures on the environment through appropriate management of the main sectors of the economy, and lifestyle choices by individuals.

In practice we act to:

- **inform the public** of the benefits of environmental protection, the actions and lifestyle necessary to secure these benefits, and the wider implications of such actions.
- **help the policy makers and professionals** develop their knowledge and skills in environmental protection.
- **promote a framework** for environmental protection within which the right balance of regulation, incentive and communication delivers improvement where it is needed, as fast as is practicable and at least cost.
- **collaborate** through the exchange of ideas and information between all with a stake in the environment.

INFORMING THE PUBLIC

The Information Department continues to provide an environmental information service to members, the public, schools, industry, academic and business enquirers, and is supported by a grant from the Department of the Environment's Environmental Action Fund. Most enquiries are met by our continually updated leaflets, factsheets and resource/contact lists. The more specialised needs of members are met by telephone advice and the NSCA library. This resource is currently being computerised, to enable us to provide a more efficient and effective service.

In 1995-96, 4,500 written enquiries were received, with a further 70-100 telephone calls each week. The table gives a general breakdown of enquiries by source.

Information Enquiries by Source

General public	22%
Junior school children	17%
GCSE students	17.5%
Teachers	11%
A level students	11%
Local authorities	8%
Undergraduates/postgraduates	6%
Industry	5.5%
Nurses	1%
Lecturers	0.5%
Police	0.5%

Information For Schools

Sustainability depends in large measure on individual choices, which in turn depend on awareness of a wide range of environmental issues and the relations between them. The Society believes that early understanding is important. We therefore attach great importance to support for education. In addition to the enquiry service we publish support materials for teachers - resource lists and factsheets on environmental topics and a series of teaching packs. Throughout the year we have attended educational conferences to promote NSCA support materials, and have recently taken part in a schools e-mail conference organised by the Science Museum.

Media Presentations and Briefings

Environmental issues are often prone to ill-informed or sensational reporting in the media. NSCA aims to provide a balanced view, briefing journalists on the technical and political complexities of environmental protection issues. During the year the Society provided expert comment for all the major news outlets and specialist media.

The hot summer of 1995 produced a number of smog episodes which served to maintain media interest in air quality issues. As a result the influence of the Society on the air quality provisions of the *Environment Act*, and the prospects for local action to reduce traffic pollution, received considerable media attention. The Society's views on developments in air quality standards were also well covered in the press, and on national radio and television. Our incoming President, Dame Barbara Clayton, who took up office in October 1995, gave a lengthy interview to Radio 4 Woman's Hour on her new role.

Other issues making the news included the Society's comments on the Budget, the NSCA/Middlesex University seminar on Particle Pollution, and our survey on neighbour noise legislation and its implications for the Noise Bill.

Public Awareness of Environmental Management Systems

NSCA believes that externally verified environmental management systems can pave the way to significant improvement in the environmental performance of commercial organisations. The potential of such systems to enhance an organisation's reputation amongst customers and neighbours and the competitive benefits which that can bring provides an incentive for adoption. The incentive depends of course on customer and neighbour awareness and in April 1995, the Society, with support from the Department of the Environment, arranged a seminar for other non-governmental organisations (NGOs) and professional bodies to boost awareness of the European Union's Eco-Management & Audit Scheme (EMAS). Following the success of that venture we commissioned, again in collaboration with DOE, Dr. David Brown to produce a booklet outlining the features of EMAS and describing how it is being implemented in industry and local authorities. The booklet was published just after the end of the report year; copies are available on request.¹

HELPING PROFESSIONALS AND POLICY MAKERS

National Conference and Seminars

The Society aims to provide topical, high quality training events for its members and others. We do this on three levels:

- our annual residential conference which ranges over the whole environmental agenda, and which is intended to keep the senior professionals with wide responsibilities up to date and/or to broaden awareness among those who have taken on new responsibilities. The 1995 Conference held at Scarborough in October attracted 325 delegates who had an opportunity to listen to 30 papers on the theme *National Targets - Local Action* and to experience and participate in informal themed discussions;
- residential workshops which allow experienced professionals to develop their skills and share knowledge with others who may be coming to grips with new responsibilities. One such workshop, *Local Air Quality Management - from Assessment to Action*, attracted 97 delegates.
- training seminars designed to bring the specialist up to date in his or her field. During the year four were held at the NEC, Birmingham, one more than in the previous year:
 - *Planning and Air Quality* (in collaboration with the Royal Town Planning Institute and the International Air Pollution Standing Conference), 15 June 1995; 161 delegates.

- *Health and Air Quality - Meeting Standards, Making Links*, 12 December 1995; 173 delegates.
- *Particulate Air Pollution* (in collaboration with Middlesex University), 31 January 1996; 159 delegates.
- *Noise Update 1996*, 15 February 1996; 166 delegates.

Pollution Handbook

As usual a new edition of the *Pollution Handbook* was published in February, containing details of all significant changes in legislation and environmental protection measures introduced before the end of the previous calendar year. Initial sales were well above those of the 1995 edition, reflecting both the scale of the legislative change in the previous 12 months and consolidation of the *Handbook's* position as the most comprehensive and up to date guide to the principles, practice and legislation of environmental protection available at such a competitive price.

Clean Air

Four issues were produced during the year. The journal's main objectives are: to present Society policy; to provide a means for the Divisions to promote their activities and thus draw attention to the benefits of membership; and to publish reports and articles on aspects of environmental protection and pollution control which members may find of value in their own work.

Staff Presentations

Presentations made by members of staff during the period under review are listed at Annex 3.

IMPROVING THE FRAMEWORK FOR ENVIRONMENTAL PROTECTION

The Society's governance is through Committee and regional Divisional Councils, which are answerable to our Divisional Council. These draw together environmental professionals from local and central government, industry, the academic community and institutional bodies. This gives us a unique capacity to form authoritative and representative views on environmental policy. Annex 1 lists those formally involved in the governance of the Society.

During the year we have used this capacity to promote improvements to legislation and the way in which it is interpreted and applied by:

- supporting parliamentary initiatives;
- responding to official consultations;
- researching the effectiveness of current law and practice, and thus providing an objective basis for comment.

Our activities in three key areas are described below to illustrate our approach. Annex 2 gives references to 24 NSCA policy statements, briefings and responses to consultation documents which state the Society's point of view on other important issues.

Air Quality Management

Royal Assent for the *Environment Act 1995* in July and the consequent passage of Part IV on Air Quality to the statute book were important as milestones in the Society's campaign for a more integrated approach to air. It is frustrating that there has been little subsequent progress. At the end of the year we were still awaiting the National Air Quality Strategy which had been promised in December 1995 and timetables for implementation. Within that strategy and in the regulations and guidance which follow it we shall be seeking:

- air quality standards and objectives for an appropriate range of pollutants which are proportional to risks to health, biodiversity and heritage, together with targets for specific years where immediate attainment would cause unacceptable social or economic problems;
- arrangements for securing a picture of air quality in time and space and estimating exposure to, and deposition of, air pollutants which is realistic in relation to standards, objectives and targets, and the technical and human resources which can be mobilised.
- mechanisms for defining and implementing least cost solutions to air quality problems. Although local authorities will have responsibility for review and assessment of air quality, few of the controls on the emissions which influence it are in LA hands. Attainment of standards in areas where ambient air quality falls short of them will therefore require well conceived channels of co-operation and co-ordination. It will also be important to agree protocols for forecasting the local outcome of measures which are outside the control of local air quality managers, for example measures which are implemented at national level.

The Noise Bill

The Society maintains a major interest in the development of noise control policy through its National Noise Committee. The period under review saw some significant developments, starting with a DOE consultation paper reviewing the effectiveness of neighbour noise controls. The most controversial proposal was a new criminal offence of night time noise nuisance. NSCA undertook a survey to determine how many local authorities were likely to adopt the proposed powers. The results were launched at the Society's *Noise Update 1996* seminar in February and have subsequently helped to inform debate on the Noise Bill. This

Private Members Bill, piloted by Harry Greenway MP with cross-party support, started its Parliamentary passage in March 1996. NSCA was able to provide full briefings to MPs and Peers on the Bill, and has co-operated closely with the Department of the Environment in securing assurances on specific concerns.

Dirty Diesel Detection Days

Local authorities all over the country took part in the national *dirty diesel detection day* initiative organised by the Society. The results were published in September². Over 40,000 vehicles were "spotted" - about 8.5% of the UK fleet - and nearly 1,000 buses and lorries reported to the Vehicle Inspectorate as being unacceptably smoky. Some participating authorities expressed frustration at lax emission standards - vehicles deemed unacceptably smoky by the public and by some officers were found to pass current emission tests. NSCA believes that there is potential for local authorities to become involved in vehicle emission enforcement as part of their new air quality management functions. However training, manpower and financial resources will be required.

Collaboration

The Society attaches great importance to integrating both the various aspects of environmental protection, and the whole subject with wider issues in the economy and society. In many areas we believe that we can improve our effectiveness in promoting environmental protection by working with others. Collaboration with the Royal Town Planning Institute and the University of Middlesex in training seminars, and with Government in promoting awareness of EMAS among third parties have been mentioned already. In addition we are planning to make an input to training programmes on air quality management organised jointly by the Chartered Institute for Environmental Health, the National Centre for Environmental Technology, and the Society. We have also collaborated with other NGOs in the Climate Action Network, the Noise Forum, the Transport Action Round Table, the Green Alliance, the Greener Motoring Forum and the European Environmental Bureau.

Released Substances and their Dispersion in the Environment

Current UK legislation requires operators of potentially polluting processes to assess the environmental impact of their activities and propose action for avoiding or mitigating them. Whilst these requirements are sensible in theory, the limited ability of many process operators, particularly in small to medium-sized enterprises, poses a barrier to realisation of their benefits in practice. The Society supported an HMIP initiative to convene a group of more than 50 commercial firms and other organisations to produce a practical guide on techniques for assessing the dispersion of released

substances in the environment, a key aspect of environmental impact analysis. The document¹ was launched in March after two years of intensive co-operative effort, with a foreword co-signed by our President, the Chairman Designate of the Environment Agency and the Chairman of the CBI Environment Committee.

DIVISIONAL PROGRAMMES

Members of the Society belong to one of ten regional Divisions which together cover the UK. Divisions provide a local focus for discussion of air quality and other issues, taking the widest perspective. Each Division elects its own Council, which is responsible for the Division's Constitution and for devising programmes which meet local circumstances. All Divisions are represented on the Society's Council and its Committees, thus ensuring good two-way communication in policy development and implementation. Below we report on some of the many Divisional activities and initiatives.

Scottish Division

This has been a year of change, with the establishment of the Scottish Environment Protection Agency (SEPA) and the local government re-organisation, and, within the Division itself, the appointment of a new Honorary Secretary, Tom McDonald of the City of Glasgow Council. Membership figures are healthier than ever, and the Division hopes to ensure that as many as possible of the new unitary authorities in Scotland take up membership.

The Division continues to flourish thanks to continued funding from the Scottish Office Environment Grant scheme, the support of its members, the hard work and dedication of its Executive Committee, and the support of the City of Glasgow Council.

During the year three seminars and a joint information workshop were held as well as the AGM. The continued good attendance at seminars is a clear indication of the recognised quality and topicality of the Division's events. In June 1995 a seminar on *Air Quality in Scotland* attracted 90 delegates and received good media coverage. A seminar on *Local Air Quality Management* held in January 1996 was also well attended and brought together a panel of speakers from NSCA, the Department of Health, the Scottish Office, TBV Science, Glasgow City Council, and an independent transport consultant. The Keynote Address was given by the Earl of Lindsay, Scottish Office Minister for Fisheries, Environment and Forestry.

The Divisional AGM was held in February, in conjunction with a seminar on the *Environment Act 1995*; this attracted 109 delegates and dealt with statutory nuisance, contaminated land, SEPA and local air quality management. The Division

collaborated with the Royal Environmental Health Institute for Scotland (REHIS) in organising a half-day seminar on the establishment of SEPA, including an address by Professor Turmeau, SEPA Chairman Designate.

Northern Ireland Division

The Division has continued to hold meetings throughout the year. The AGM was in May, and was followed by a lecture on parasites in farmed fish given by Dr Stephen Field of the Environment Service.

In September 1995 a well attended open meeting on *Transport and the Environment* was held at Ballyclare with speakers on future transport policy and emissions from transport, especially buses.

The *Environmental Protection Act 1990* is being introduced in Northern Ireland by stages. Two draft orders have been issued during the period under review - the *Waste and Contaminated Land Order* and the *Industrial Pollution Control Order*; these are broadly similar to the waste and IPC and air pollution control sections of the EPA 1990. A Divisional meeting was organised for April to discuss both of these orders.

Northern Division

Three meetings of the Division were held during the year and visits arranged: at the Enron Gas Fired Power Station where the contribution to energy production by a gas station as well as a comparison with coal fired stations was demonstrated; at the Hartlepool Power Station members saw the Magnox Reactors and visited the recently opened Environmental Centre; finally members of the Division visited the Broken Scar Water Treatment Works to look at newly commissioned processes.

North West Division

A Divisional Council meeting in May opened with a presentation by Envirotech on air quality monitoring and real time analysis; this gave rise to lengthy discussion on air quality assessment, monitoring systems, urban pollution determination and emission inventories.

The AGM, held at Manchester Airport in September 1995, was well attended. In the afternoon members were addressed by the Airport's Environmental Control Manager on the Airport's environment policy, and by a speaker from the Atmospheric Research and Information Centre, who talked about air pollution monitoring and control at the Airport.

The November 1995 Divisional Council meeting was hosted by GMSS Laboratory in Manchester and was followed by a tour of the Laboratory.

Yorkshire & Humberside Division

Divisional Council and open meetings were held regularly throughout the year. In April 1995 the Division held a special meeting at Selby on *The Future for Flue Gas Desulphurisation at Coal Fired Power Stations*. Lively discussion on this important issue followed speakers from Selby DC, Wakefield MDC and HMIP. The May 1995 meeting was hosted by British Steel, Scunthorpe, with a speaker outlining British Steel's approach to environmental issues; a speaker from Scunthorpe DC described the Council's technical twinning work with Ostrowiec in Poland.

The AGM in September 1995 included a talk by the Division's Chairman on *Environmental Protection - Past, Present and Future*. Mr Frank Price of Sheffield City Council took over the post of Honorary Secretary from Mr Stephen Carden of Wakefield City Council at this meeting.

Members attending a meeting at Leeds Civic Hall in January 1996 were welcomed by the Lord Mayor. The meeting, on air quality management, was addressed by speakers from DOE Air Quality Division and Leeds City Council, and concluded with a visit to Leeds Energy Advice Centre.

West Midlands Division

The Division's AGM at Stratford-on-Avon in October was addressed by the Society's Secretary General and followed by a visit to Sims Bird Ltd.

In January 1996 members met at Cannock and were addressed by a regional Director of Business in the Environment.

East Midlands and Eastern Division

The AGM was held in June and was followed by presentations by European Gas Turbines and Delta Simons Environmental Consultants.

In September a number of members visited Sizewell 'B' Power Station on the Suffolk coast and were addressed by the Station's Communications Officer and its Environmental Officer. The Division's final open meeting of 1995 was held at Hanson Brick, Kirton Brickworks in Nottinghamshire and included two technical presentations and a tour of the plant.

South East Division

Divisional Council meetings have been held regularly during the year. The Division's 40th AGM was held in May 1995 and followed by a talk by the Regional General Manager of the NRA Thames Region, who spoke about the work of the NRA and the future in the context of the Environment Agency.

The Division has for some time been concerned about the rising numbers of children and adults suffering from respiratory illness, and the

differences in perception of its cause. In order to address some of its concerns the Division, in conjunction with the South East Institute of Public Health, held a seminar on *Asthma; Confronting the Myths* in November 1995. This attracted 128 delegates from a wide range of interests including medical practitioners, nurses, social workers, EHOs, councillors and students.

During the period under review, the Division has also taken a particular interest in the White Paper on Rural England. It is also currently planning a sponsored event aimed at raising awareness of air quality among young people.

South West Division

The Division has held meetings across the region throughout the year. In May 1995, a Divisional Workshop discussed the effectiveness of neighbour noise controls and *Air Quality - Meeting the Challenge*, feeding in valuable comments on these legislative proposals to NSCA's Brighton Office. In June a well attended meeting in Cornwall was able to see at first hand the workings of a windfarm. Following the AGM an invited speaker from AEA Technology introduced the subject of energy and transport with particular reference to how future emissions standards will be achieved.

The Division's September meeting was hosted by Bath City Council and included a presentation on *Traffic and Air Quality in Bath* from the Assistant Director for Environmental Services, together with a speaker from ETSU on *Urban Transport and the Environment*. The December meeting was hosted by Taunton Deane BC and included presentations on dioxins, with 1996 beginning with a visit to Coal Technology, Cheltenham, where a seminar and tour were arranged of the gasification system in alternative power generation.

South and Mid Wales Division

The Division held its AGM in October 1995, when Mr. Terry Jones stepped down as Divisional Honorary Secretary after 17 years in that office. The new Honorary Secretary is Mr. Rob West of Cardiff City Council. A guest speaker from the National Rivers Authority addressed the meeting on the role of the Environment Agency and how it will affect local authority responsibilities.

INTERNATIONAL

International Union of Air Pollution Prevention & Environmental Protection Associations (IUAPPA)

The Society has continued to provide the Union's secretariat in support of the Director General, John Langston. There was a high level of activity to support the 10th World Clean Air Congress in Helsinki in May 1995. The third edition of *Clean Air Around The World* was published in summer 1995.

European Environmental Bureau (EEB)

The Society continues to gain benefit from its membership of EEB. The Bureau's briefings on European environmental issues have again been extremely useful. National meetings have afforded staff an opportunity to establish common ground with other non-governmental organisations in the environmental field and to join them in meetings with the Secretary of State for Environment before EU Environment Ministers' Council meetings.

FINANCE AND MEMBERSHIP

The Annual Accounts for 1995/96 have been published as a separate document. Total gross income is substantially higher than for 1995/95 due

mainly to IUAPPA printing contracts. Conference and seminar activity was maintained at the same level as last year reflecting the Society's continuing commitment to training and to providing a forum for discussion. Effective budgetary control over all expenditure has ensured that the Society receives value for money.

During the year there has been an increase in both corporate and local authority membership (8 and 11 respectively), but a reduction of 9 in individual membership. However, in 1996/97 the effects of local authority reorganisation are likely to be reflected in the Society's membership.

REPORT OF THE COUNCIL

The members of the Council present their report and the accounts (see separate publication) for the year ended 31 March 1996.

Principal Activities

The National Society for Clean Air and Environmental Protection is a non-governmental organisation and a registered charity. Its origins date back to the Coal Smoke Abatement Society (founded in 1899), but today it has widened its interests and the source of its activities and influence.

NSCA membership is largely made up of organisations with a direct involvement in environmental protection: industry, local authorities, universities and colleges, professional institutions, environmental consultancies and regulatory agencies. Membership is also available to private individuals with a particular interest in our activities.

The Society provides a focus for dialogue between environmental protection specialists through national meetings, regional activities, conferences, seminars and workshops.

We provide a source of specialist information for members, publishing the NSCA *Pollution Handbook*, our journal *Clean Air and Environmental Protection*, briefings, papers, as well as providing an Information Service and Library. We also provide a source of straightforward and accurate information for the public and schools, with information leaflets, factsheets, booklets and teaching packs.

We aim to influence the environmental agenda and position environmental issues in a broader social and economic context by contact with policy makers, research and survey work, and through co-operation with other interest groups.

The Chairman's Report provides a more detailed description of activities in the year.

Members of the Council

The directors, being members of the Council, who served during the year are shown at Annex 1.

Responsibilities of the Council

Company law requires the members of the Council to prepare financial statements for each financial year which give a true and fair view of the state of affairs of the Society and of the surplus or deficit of the Society for that period. In preparing those financial statements, the Council is required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- prepare the financial statements on the going concern basis unless it is inappropriate to presume that the Society will continue its activities.

The Council is responsible for keeping proper accounting records which disclose with reasonable accuracy at any time the financial position of the Society and enable it to ensure that the financial statements comply with the *Companies Act 1985*. It is also responsible for safeguarding the assets of the Society and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

Auditors

The auditors, Geo. Little, Sebire & Co, Chartered Accountants, have signified their willingness to continue in office.

By order of the Council of the Secretary

Dr. R.N. Crossett
Secretary General

9 September 1996

ANNEX 1 - GOVERNANCE OF THE SOCIETY

1 April 1995 - 31 March 1996

(a) Members of the Council of the Society
(including affiliation, date of appointment to, or retirement from, Council, where appropriate, and membership of Standing Committees)

Key:

- (i) F&A = Finance & Administration Committee
C&P = Conference & Promotions Committee
TEC = Technical Committee
PLG = Parliamentary & Local Government Committee
NOI = National Noise Committee
c = co-opted member of a Committee

(ii) Officers of the Society and Honorary Secretaries are indicated in bold type.

Adams, P. West Midlands Division; appt 23.10.95; (PLG)

Adrain, S. National Power; appt 15 March 96; (TEC)

Allan, Cllr Mrs Y. Scottish Division; (C&P, F&A)

Atkinson, K. Secretary, Northern Division; (NOI)

Barnes, Dr. R.A. South East Division; (TEC)

Barrett, G. (Chairman of Council); PowerGen; (All)

Beagle, J.J. Secretary, South East Division; (NOI, TEC)

Bloxsome, Cllr V. Northern Division; (C&P, NOI)

Blythe, A. Chartered Institute of Environmental Health; appt 17.10.95; (PLG)

Boddy, J.H. South East Division; retired 23.10.95; (TEC, TECc)

Bramley, Cllr J.M. Yorks & Humberside Division; retired 31.5.96

Brown, A. retired as Chairman, East Midlands Division 23.10.95; (PLG, TECc)

Bryant, A. North West Division; (TEC)

Burdett, Dr. N.A. National Power; retired 15.3.96

Carr, Cllr. J. Deputy Chairman of Council & Chairman, Yorks & Humberside Division; (All)

Carlaw, D. The Institution of Gas Engineers; retired 23.10.95; (TEC)

Caselon, Cllr G. Yorkshire & Humberside Division; appt 6.10.95; (C&P)

Clayton, Dame Barbara, President; elected 23.10.95; (All)

Colling, G. West Midlands Division; (NOI)

Cooney, P. 1st Deputy Chairman of Council & Chairman, South East Division; (All)

Cope, D.R. UK Centre for Economic and Environmental Development; (TEC)

Crosby, R. Yorks & Humberside Division; (PLG)

Dunn, Cllr W. East Midlands Division; appt 23.10.95; (NOI, PLG)

Evans, Cllr Dr. J.R.P. Immediate Past Chairman of Council & Chairman, South & Mid Wales Division; retired 31.3.96; (All)

Fleming, M. Secretary, Northern Ireland Division

Fry, C.C.H. West Midlands Division; (TEC)

Hancox, Cllr W. West Midlands Division; retired 23.10.95

Harrop, Dr. O. Scottish Division; retired 11.3.96

Hickmott, S. South East Division; (PLG)

Hill, R. Honorary Treasurer; (All)

Horton, K. South West Division; (PLG, F&A, NOI)

Inglefield, Mrs E.J. East Midlands Division; (C&P, NOI)

Jones, T. Secretary, South & Mid Wales Division; retired 23.10.95; (PLG)

Kaufman, K.G. North West Division; (C&P, NOI)

Lawson, Dr. R. South West Division; (PLG, NOI)

Laxen, Dr. D. South West Division; (TEC)

Lewis, Professor Lord, Immediate Past President; retired as President 23.10.95; (All)

Leyden, Cllr K. North West Division; (F&A)

Mann, J.A. Northern Division; (PLG)

Marsh, Cllr B. South East Division; appt 23.10.95; (PLG, NOI)

McEgan, Cllr D. North West Division; (C&P)

Murlis, Dr. J. HM Inspectorate of Pollution; appt 23.10.95; retired 31.3.96; (TEC)

Naylor, Mrs G.E. South East Division; retired 23.10.95

Norman, Cllr S. West Midlands Division; appt 23.10.95; (C&P)

Nowell, H. South West Division; (F&A)

Phipps, J. The Institute of Petroleum; (TEC)

Platt, The Baroness, of Writtle; retired as Immediate Past President 23.10.95

Poole, Cllr L. Vice-President, & Chairman, Northern Division; (All)

Price, F. Secretary, Yorks & Humberside Division; appt 23.10.95; (TEC)

Rees, A.J. South East Division; (PLG, NOI, F&A)

Rees, G. Yorks & Humberside Division; (NOI)

Rice, J.N. South East Division; (TEC)

Roberts, K. North West Division; (TEC)

Sage, P.W. British Coal; retired 20.9.95; (TEC)

Schwar, Dr. M.J.R. South East Division

Scorer, Prof. R.S. South East Division; (TEC)

Shephard, Dr. F.E. The Institution of Gas Engineers & British Gas R&T; (PLG)

Simpson, J.B. North West Division; retired 31.1.96; (PLG)

Smith, Cllr F.J. South East Division; (C&P)

Solkhon, Mrs B.J. South East Division; (C&P, F&A)

Swinerton, Dr. C. National Rivers Authority; retired 31.3.96

Thomas, Cllr H.I. South & Mid Wales Division; (C&P)

Thomas, K. Scottish Division; (NOI)

Townsend, T. West Midlands Division; retired 23.10.95

Tranmer, N. East Midlands Division; (TEC, NOI)

Turner, R.N. Secretary, North West Division; (PLG, TECc)

Vulkan, G. South East Division; appt 23.10.95; (NOI)

West, R. Secretary, South & Mid Wales Division (appt 23.10.95); (TEC)

Whitty, K.F. British Steel plc; (TEC)

Williams, Cllr W.K. East Midlands Division; (PLG)

Note:

The Honorary Officers (the President, Chairman, Honorary Treasurer, two Deputy Chairmen, and the Immediate Past Chairman) are ex-officio members of all Committees. The Honorary Officers are listed as at the 1995 AGM - 23 October 95.

The Chairmen of the Conference & Promotions Committee, the Parliamentary & Local Government Committee, the Technical Committee and the National Noise Committee are ex-officio members of the Finance & Administration Committee.

(b) Honorary Secretaries of Divisions who are not Members of Council

Gendle, P. (South West Division)
McDonald, T. (Scottish Division; appt 20.2.96)
MacDonald, C. (Scottish Division; retired 20.2.96)
Pearce, Dr. W. (East Midlands/Eastern Divisions)
Sweetland, J. (West Midlands Division)

(c) Chairmen of Divisions who are not Members of Council

Bottomley, G. (East Midlands/Eastern Divisions)
Dawson, H. (South West Division)
Hancox, Cllr. W.J. (West Midlands Division)
Hebden, R. (North West Division, retired 23.10.95)
Rooney, Alderman J. (Northern Ireland Division)
Ross, Mrs. J. (Scottish Division)
Shaw, Cllr. K. (North West Division, appt 23.10.95)

(d) Co-opted Members of Standing Committees (not on the Council)

Bailey, M. (NOI - appt 23.10.95)
Barratt, Dr. R.S. (TEC)
Bell, W.A. (TEC)
Bigg, Dr. M. (TEC)
Boddy, J.H. (TEC - appt 23.10.95)
Carslaw, D. (TEC - appt 23.10.95)
Elsom, Prof. D. (TEC)
Evans, J. (NOI - retired 23.10.95)
Fisher, Prof. B. (TEC)
Fothergill, Dr. L. (NOI - retired 23.10.95)
Fox, Prof. M. (TEC)
Freeborn, P.T. (NOI)
Gregory, Dr. K. (TEC)
Gibbon, A. J. (NOI - retired 23.10.95)
Grimwood, C. (NOI)
Hams, T. (PLG)
Harrison, Prof. J.S. (TEC)
Hawkins, M. (TEC - appt 8.2.96)
Hinton, J. (NOI - retired 23.10.95)
Jones, Cllr. M. (NOI)
Kaye, R. (C&P)
Lees, B. (TEC)
Maslivec, S. (NOI)
Romaine, D. (NOI)
Sage, P.W. (TEC)
Scannell, K. (NOI - retired 23.10.95)
Tunncliffe, M. (TEC)
Wadge, Dr. A. (TEC)

Waller, R.E. (TEC)
Wilson, P. (NOI)
Woodfield, M. (TEC)
Vulkan, G.H.

(e) Vice-Presidents

“Vice-Presidents shall normally be elected for a term of three years and may stand for re-election” (Art.27(b) of Articles of Association). Elections take place at the Society’s AGM in October.

Bennett, A., MP (elected 1995)
Collins, K., MEP (re-elected 1994)
Cranbrook, The Rt Hon The Earl of, DSc, DL (re-elected 1995)
David, W., MEP (elected 1993)
Edmonds, J. (re-elected 1992)
Jackson, Dr. C. (re-elected 1995)
Langston, Air Cdre. J., CBE (elected 1994)
Mason, Sir John, CB, DSc, FRS (elected 1993)
Nathan, The Rt Hon Lord, MA, FSA, FRSA, FRGS (re-elected 1995)
Poole, Cllr. L., BEM, JP (elected 1994)
Rossi, Sir Hugh (re-elected 1994)
Speirs, J. (re-elected 1995)
Wardell, G., MP (re-elected 1994)
Platt, The Baroness, of Writtle, CBE, DL, FEng (elected 1995)

ANNEX 2 - RESPONSES AND POLICY DOCUMENTS

Listed below are NSCA policy documents and responses to consultation documents from 1 April 1995 - 31 March 1996. The date given in each entry is the date of NSCA’s response. Where a response has been published in *Clean Air* a reference is given; copies are also available from NSCA in Brighton on receipt of an SAE.

1995

Statutory Nuisance (Appeals) Regulations 1990 (12 April).

HMIP - Environmental, Economic and BPEO Assessment Principles for IPC - final draft (preliminary response 20 April).

Environment Bill - NSCA commentary: Selected Committee Stage Amendments (24 April).

HMIP - Revisions to IPR Notes relating to Fuel Production and Combustion Processes (18 May); *Clean Air*, 1995 Vol 25(2).

Cemfuel: Environment Committee Enquiry into Burning of Secondary Liquid Fuels in Cement Kilns (22 May); *Clean Air*, 1995 Vol 25(2).

HMCE/DOE et al - Landfill Tax consultation paper (9 June); *Clean Air*, 1995 Vol 25(2).

Amendment to Environment Bill on Air Quality Management (21 June).

DOE - Review of the Effectiveness of Neighbour Noise Controls (28 June); *Clean Air*, 1995 Vol 25(2).

Air Quality Management: LA power over roads - with reference to the proposed legal action against LB Greenwich (4 July).

DoT - Amendment to Construction & Use Regulations, reg. 61: Exhaust Emission Requirements (13 July).

DOE - Revisions to Prescribed Processes & Substances Regulations 1991, SI 472 (21 July).

DOE/MAFF/WO - Guidance to the Environment Agency under the Environment Bill on its Objectives (31 July).

DOE - Noise & Statutory Nuisance Act 1993 - Audible Intruder Alarm Provisions - draft regulations (16 August).

HMIP - Process Guidance Note on Combustion & Carbonization: Gasification of Solid and Liquid Feedstocks including IGCC (18 August).

DOE - Planning Policy Guidance Note 6: Town Centres and Retail Development (29 September).

DoT - Road Humps Regulations - Deregulation (16 October).

DOE - Research Project: Environmental Impact of Traffic Associated with Mineral Workings (6 November).

DOE - Noise from Car Stereos and Radios (13 November).

DOE - Road Vehicles (Construction & Use) Regulations 1986, amendments to Regulation 57A - Marking Requirements for Moped Silencers (1 December).

1996

HMIP - Chief Inspector's Guidance Notes to Issue Series 2[S2]5.01 - Waste Disposal and Re-cycling: Waste Incineration (5 February).

MAFF - Review of Crop Residues (Burning) Regulations 1993 (28 February).

RCEP - Study on the Basis for Environmental Standards (1 March).

Code of Practice on Noise from Oval Circuit Motor Racing (NSCA Noise Committee) - (30 March); *Clean Air*, 1996 Vol 26(1).

Briefings to MPs on the Committee Stage of the Noise Bill (11 and 18 March).

ANNEX 3 - PRESENTATIONS GIVEN BY NSCA STAFF

1 April 1995 - 31 March 1996

Secretary General

1. Outside organisations

NSCA/DOE Environmental Management & Audit Scheme Workshop, London (convenor/chairman) (5th April).

UK Environmental Law Association Annual Conference, Bristol (member of panel discussion on Traffic and Pollution) (8th April).

Bureau of Air Management, Wisconsin Department of Natural Resources, Madison, Wisconsin, leader of *Air Quality in the UK* seminar (28 April).

University of Sussex, Environmental Science Research Group - leader of *Management of Ambient Air Quality* seminar (17 May).

University of Greenwich, workshop on *Models for Predicting Air Pollution around Roads in Urban and Rural Areas* (final summing up) (23 June).

South East Institute of Public Health, Air Quality Management Skills Development Programme - speaker on *Air Quality Management - US and UK Experience* (29 June).

Brighton & Hove Common Purpose one-day meeting on Planning, Transport & The Environment, Brighton - keynote speaker on *Energy and Transport: think globally, act locally* (5 July).

Kent County Council's Air Quality Management System Launch - speaker on *The Next Steps* (28 September).

Chartered Institute of Environmental Health, Welsh Council Weekend Course - speaker on *Air Pollution and Sustainable Development* (25 November).

Local Transport Today conference on Effective Local Air Quality Management - speaker on *How Local Authorities fit into the Provisions of the Environment Act* (29 November).

CIPA/ISER/CSIA Symposium in Sicily on Air Quality Management in Industrial Areas - speaker on *The UK Approach to Air Quality Management in Industrial Areas* (19 January).

IBC Conference on Improving and Managing Urban Air Quality, London - speaker on *Challenges for Transport* (15 March).

Corporation of London Seminar on The Environment Act 1995 - speaker on *Air Quality Management - The Promise and the Problems* (22 March).

2. NSCA Divisional and National Meetings

South & Mid Wales Division Seminar, Sustainable Development in a Year of Change, speaker on *Sustainability, Energy & Transport* (17 July).

West Midlands Division AGM, speaker on *Part IV of the 1995 Environment Act - Development of Air Quality Assessment & Management in the UK* (11 October).

NSCA national conference, Environmental Protection 1995, Scarborough - speaker on *The Importance of Forecasting in Air Pollution Management - 10-15 Year Outlook* in parallel technical session (24 October).

1996

Scottish Division Seminar on Local Air Quality Management, Edinburgh - speaker on *The NSCA Perspective* (15 January).

Scottish Division - AGM/Seminar on The Environment Act 1995 (20 February).

NSCA Spring Workshop on Local Air Quality Management: from assessment to action, Abingdon, round-up comments (27 March).

Communications Officer

London First Seminar: Air Quality in London (31 May).

DOE Noise Forum: Noise Publicity (17 October).

Association of London Government Conference: Community Consultation and Air Quality (21 March).

- 1 *EMAS - A Catalyst for Change*, NSCA/DOE 1996
- 2 *Report Local Authority Dirty Diesel Detection Days*, available from NSCA price £10.00
- 3 *Released Substances and their Dispersion in the Environment*, HMSO, London 1996, ISBN 0-11-702010-9

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“the recommended daily standard is currently exceeded for about 10% of the year at most measurement sites in the UK”. (DOE, 1995)

This sits uncomfortably besides the accepted evidence that rises of 10 $\mu\text{g}/\text{m}^3$ are accompanied by an increase in relative risk of mortality of about 1% in the population, including elevated relative risk from both respiratory (around 3.4%) and cardiac (around 1.4%) causes (Seaton et al, 1995). Moreover, the government departments responsible appear to take a short-term view (10 years) which coincides with the predicted decline in emissions up to 2005 associated with catalytic converters. The projected increase in traffic after 2005 will, however, outstrip the benefits gained. A moot point.

Despite the economically driven curtailments to the roads programme traffic growth continues at roughly 3% per year. Even with the small expansion of network capacity that the 1989 roads programme envisaged, supply can nowhere near meet ‘demand’. As Goodwin (1994) has noted:

“this is the core transport planning axiom of our time, and it will affect everything else in the transport sector of the economy”.

The implication is readily understood in the transport planning arena, at least the theory. This, an analysis of the British Social Attitudes Survey suggests, is also increasingly the case with the general public through clear evidence that a shift in spending from road building to public transport would be welcomed (Stokes and Taylor, 1995). As the European Environment Agency (1995) has noted, this ‘new realism’ means that (in an EU context as well as UK), apart from introducing further technology-forcing product requirements, the challenge is to design new transport systems including re-engineering of infrastructure to satisfy mobility demands in a more sustainable way than motorised road transport. Yet, cynically it can be argued, that by handing over more powers and responsibilities to local authorities for combating vehicle pollution central government removes itself from any public backlash against possible traffic restrictions. This comes at a time when the likelihood of any significant funds which can contribute to a reverse in the trends of declining public transport patronage and walking and cycling is small.

Discussion

It is plausible that the shift in UK public perceptions, as illustrated above, may have an impact on transport policy which enables local authorities to implement stronger restraint policies. Medically derived targets and thresholds for air quality which have to bear some relationship with the calculated economic costs of ill health (set against remedial costs) may not sufficiently allay public concerns even when air pollution levels remain below thresholds.

And, as the Department of the Environment’s 1994 discussion paper noted:

“studies in the last year or two ... have indicated effects on health at pollutant levels which would not have been considered a problem ten years ago”. (DOE, 1994b)

This adds further weight to existing pressures for adoption of the precautionary principle, aided by Agenda 21 and HFA, and would suggest setting air quality standards lower than those likely to be proposed given current medical knowledge and a political propensity ‘not to rock the boat’.

Finally, rising perceptions of poor air quality, on their own, would be insufficient to influence transport policy. Yet in combination with wider acceptance for the ‘new realism’ and heightened localised concerns that motor traffic levels are undermining health and quality of life (e.g. Greenwich) it may well be that local authorities can muster sufficient support to enable them to implement transport measures which can significantly improve modal split away from the internal combustion engine. Irrespective of significant air quality improvements this might bring it may, nonetheless, improve quality of life.

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FIRST ANNOUNCEMENT AND CALL FOR PAPERS

INTERNATIONAL CONFERENCE CONTROLLING INDUSTRIAL EMISSIONS London, November 1997

This international conference, organised by the Institute of Chemical Engineers, in association with the Institution of Mechanical Engineers, the Institute of Energy and NSCA, will focus on practical experience from operating plant with particular emphasis on the increasing importance of the integrated approach towards the management of emissions to the environment. Poster sessions will focus on the status of industrial and academic research. Authors should submit a title with a 200 word abstract by 6 December 1996 to

Miss Julie Morgan
ICChemE
165-189 Railway Terrace
Rugby, Warwickshire CV21 3HQ

Tel: 01788 578214; Fax: 01788 577182;
Email: jmorgan@icheme.org.uk

NSCA TRAINING SEMINAR

MAKING WASTE WORK FOR YOU Developing BPEO for Waste Disposal

National Exhibition Centre, Birmingham
Tuesday, 26 November 1996

This seminar will examine the logistics of waste collection and separation and the environmental, economic and social costs options for its separation, treatment and disposal. The aim is to help all those concerned - waste operators, regulators and local authorities - with agreement of BPEO to address these issues in an informed manner, and to identify means by which public consensus on the acceptability of waste management options can be achieved at local level.

Seminar fee: £95 + VAT (NSCA members); £125 + VAT (non-members).

Details from: NSCA, 136 North Street, Brighton BN1 1RG.
Tel: 01273 326313; Fax: 01273 735802.
Email: cleanair@mistral.co.uk.

UPDATE

ENVIRONMENTAL STATISTICS

The Department of Environment's Annual *Digest of Environmental Statistics* was published in June 1996 and included the following points of interest (all figures relate to 1994 unless otherwise stated):

- Emissions of **carbon dioxide** at 149 million tonnes were 1 million tonnes lower than 1993; power stations remain the main source of emissions, with industrial and domestic consumption accounting for over half the emissions by end user.
- Landfill and cattle contributed 46% and 21% respectively to total **methane** emissions of 3.9 million tonnes (almost 6% lower than 1993).
- **Sulphur dioxide** emissions at 2.7 million tonnes were 45% lower than 1980; power stations accounted for 65% of the total, compared with 61% in 1980.
- Total **black smoke** emissions decreased by around 4% in 1994 to 426 thousand tonnes. Emissions from road transport have more than doubled since 1980 and now account for about 58% of all emissions. Emissions of smaller **particles (PM₁₀)** remain fairly constant though they have fallen 23% since 1980 to 263 thousand tonnes in 1993.
- Emissions of **nitrogen oxides** fell to 2.2 million in 1994, the lowest level since 1975. While road traffic accounted for 49% of the total in 1994, emissions have fallen in each of the previous 5 years following the introduction of catalytic converters.
- Road traffic accounts for 88% of **carbon monoxide** emissions, but emissions from this source have also been falling since the introduction of catalytic converters. Total emissions in 1994 were 4.8 million tonnes, compared with 5.3 million tonnes in 1993.
- **VOC** emissions totalled 2.1 million tonnes in 1994, with solvent use accounting for 31% and road transport 29%.
- **Air Quality:** "Poor" air quality as a result of ground level **ozone** was recorded at 15 out of 30 monitoring sites on at least one occasion in 1994. No site recorded "very poor" air quality, though exceedances of the more stringent WHO guideline were recorded at 19 sites. "Poor" air quality for **nitrogen dioxide** was recorded on at least one occasion at 18 of the 26 sites and in respect of **sulphur dioxide** at 12 of the 23 monitoring sites. Leeds Centre also recorded one hour of "very poor" air quality in 1994.
- **Unleaded petrol** accounted for 66% of UK deliveries as at March 1996, 5% higher than in 1995.
- **Noise** complaints from all sources in England and Wales rose 6% in 1993/94 (over 1992/93). Complaints about noise from domestic premises rose almost 18% over the same period.
- In 1994 91% of **rivers and canals** in England and Wales were graded as "good" or "fair" under the NRA's General Quality Assessment Scheme. Using a different grading scheme 99% of rivers and canals in Scotland were graded as "unpolluted" or "fairly good" and in Northern Ireland almost 99% were of "good" or "fair" quality.
- In 1995, 89% of identified **bathing waters** in the UK complied with the EC Bathing Water Directive on mandatory coliform standards.

The Annual Digest is available from HMSO and other booksellers, price £22.

PROGRESS ON AIR QUALITY MANAGEMENT

After a series of delays, the Government has now issued the **National Air Quality Strategy** as a public consultation document. A detailed briefing on the Strategy is provided as an insert to this edition of *Clean Air*. The publication of the finalised Strategy is still on schedule for December, but observers are less optimistic about the chances of having a full suite of guidance and regulations ready for local authorities by the 1 April 1997 deadline.

Local authorities involved with the **first phase implementation** work have agreed a £2M programme of administration and scientific/technical expenditure with DOE, and draft guidance on air quality reviews is being circulated. Some authorities have expressed concern that the initial work is biased towards research into monitoring and model evaluation, rather than the practicalities of review and assessment. In response, DOE has made it clear that it is important to fill in gaps in knowledge and test specific aspects of the guidance before proceeding further. NSCA's Local Air Quality Information Network continues to monitor progress, and has discussed first phase local authority concerns with DOE officials.

NOISE ACT 1996

The *Noise Act 1996*, which received the Royal Assent on 18 July 1996, introduces a new offence of night time noise nuisance from domestic dwellings; it also enables local authorities to confiscate noisemaking equipment and clarifies these powers under statutory nuisance legislation.

The Act covers England and Wales and Northern Ireland; the *Civic Government (Scotland) Act 1982* already enables local authorities and the police in Scotland to take similar action.

Those parts of the Act enabling a local authority to take action in respect of night time noise when this exceeds a specified standard are adoptive; the Act does however give the Secretary of State reserve powers to require a local authority to take up the new powers if it is felt they are needed and the local authority is taking no action.

The Act defines night as 11.00 p.m. to 7.00 a.m. the following morning. Local authorities (who have adopted the relevant powers) have a duty to take reasonable steps to investigate a complaint from an individual about noise from another dwelling. If it is thought that the noise exceeds, or might exceed, the permitted level, then a warning notice should be served. An offence is committed if the noise continues to exceed the permitted level during the time specified in the warning notice; the offender then becomes liable for prosecution and if convicted, liable to a maximum fine of £1,000; the local authority authorised officer may instead issue a fixed penalty notice for £100 which must be paid within 14 days.

If a warning notice has been served and the noise continues then the local authority may take steps to confiscate the noisemaking equipment; a local authority taking steps to abate a noise nuisance under the *Environmental Protection Act 1990* may also confiscate the offending equipment. It may be kept for 28 days or if court proceedings are instigated, until after the case has come to court. Regulations will provide for the retention and safekeeping of any equipment seized and the charges which the local authority may recover.

Those sections of the Act which clarify local authority powers to confiscate noisemaking equipment under the EPA are expected to be implemented by Order in the Autumn; the DOE is also expected to consult in the Autumn on the detailed technical proposals for the setting and measurement of the standard for the new night time offence, with a view to the remainder of the Act being brought into force in April 1997.

SULPHUR DIOXIDE REDUCTION STRATEGY

At the end of June the Government published its proposals for a national strategy for reducing emissions of sulphur dioxide to enable the UK to meet its commitments under the UNECE's second Sulphur Protocol; this requires a reduction in UK sulphur dioxide emissions of 50% by 2000, 70% by 2005 and 80% by 2005, compared with 1980 levels.

Three factors are considered to influence the future level of sulphur dioxide emissions in the UK; these are:

- the continuing move from industrial burning of coal and heavy fuel oil to gas;

- the completion of the current programme of fitting flue gas desulphurisation at power stations in England and Wales; and
- the requirement for industrial processes to use BATNEEC.

According to the draft Strategy, current programmes for reducing emissions, particularly from power stations, will enable the first two targets under the Protocol to be met without any additional measures; the programmes may of course need adjustment to meet short term air quality standards or any new initiatives agreed by the European Community.

The draft Strategy also reviews the performance of the existing National Plan, which gives effect in the UK to the requirements of the EC's Large Combustion Plant Directive. It is proposed to make a number of adjustments to the Plan to ensure future allocations of emissions quota are more closely in line with regulatory consents under Integrated Pollution Control. Also new flexibilities in the revised authorisations for the electricity supply industry in England and Wales allow generators to switch emissions between stations, provided that this results in no adverse impact on the environment; the new authorisations also put in place an improvement programme which, over the period of the Protocol will result in substantial reductions in sulphur dioxide emissions. While these measures do not guarantee that the 2010 targets in the Protocol will be met, any under-achievement is likely to be small. However, advances in technology and control techniques during the life of the Protocol could result in further improvements becoming economically viable. The Government plans to review its Strategy in three years.

NSCA's response to the draft Strategy will be included in the January-February 1997 issue of *Clean Air*.

SEVEN POINT PLAN TO LIMIT CLIMATE CHANGE

The UK is on course to meet its commitment made at the Earth Summit to stabilise carbon dioxide emissions at 1990 levels by the year 2000. Speaking at a meeting in Geneva in July, Environment Secretary, John Gummer, said that the UK's emissions were in fact likely to be some 4-8% below 1990 levels.

Reminding delegates that climate change was no longer an issue that could be ignored, he said that globally significant reductions in greenhouse gas emissions could be made if all governments were to adopt the following policies and measures to which the UK is committed:

- removing subsidies on the use of fossil fuels;
- the introduction of competition into energy markets;
- a significant increase in road fuel duties;
- improve the fuel efficiency of cars;

- the introduction of a tax on aviation fuel;
- renewed efforts to improve energy efficiency;
- improve minimum energy efficiency standards for domestic appliances and office equipment.

LOCAL AGENDA 21 PROJECT

At the 1992 UN Conference on Environment and Development (the Earth Summit), 178 national delegations signed up to "Agenda 21". This document recognises that environment and development problems are inextricably linked and promotes sustainable development as a way of dealing with them. Agenda 21 calls on all local authorities to consult their communities and develop a Local Agenda 21; this should be an agreement on the problems and priorities, and a programme of action involving individuals and organisations locally.

Surveys show that most local authorities are taking these commitments seriously and that many have begun projects to promote local sustainability. NGOs, business and community groups are also carrying out similar projects. The Environment Resource and Information Centre (which is supported by, among others, the local authority associations, LGMB and the United Nations Association) has now been commissioned by the Local Government Management Board to coordinate a project to seek out and disseminate interesting practice in Local Agenda 21. The project team is particularly looking for examples of partnership working with two or more organisations coming together to produce positive change. Some projects will be chosen for publication as a case study or will appear in magazines which are circulated to people working in this area.

For more details, including a copy of the criteria to be used for selecting case studies and pro forma for completion, contact Ben Tuxworth, ERIC, University of Westminster, 35 Marylebone Road, London NW1 5LS. Tel: 0171 911 5000; Fax: 0171 911 5171.

NOISE CONTROL IN FRANCE

A new law in France, which is due to come into force later this year, will limit the output from personal stereos to 100 decibels. They will also have to carry a health warning - that prolonged use can damage hearing. Manufacturers of personal stereos are concerned about the law on two counts: first that there is currently no agreed method for measuring sound output from personal stereos; and secondly that there is as yet no firm statistical evidence that use of personal stereos at high volume results in permanent damage to hearing, although there is an increased risk.

The new law could however fall foul of the European Commission which may view it as a barrier to free trade. (*From New Scientist*, 29.6.96)

EMISSIONS-BASED CAR TAX IN GERMANY

From 1997 German motorists will pay a car tax based on their car's ability to meet certain emission controls; there are to be four categories of payment:

- Cars meeting Euro I standards and which can still be driven during ozone alerts: DM13.2 and DM37.1 per 100 cc for petrol and diesel respectively;
- Cars which fail to meet Euro I limits will pay an additional DM20 on the above rates;
- Cars meeting Euro II standards: DM10 and DM27 per 100 cc for petrol and diesel respectively;
- Cars meeting Euro III standards and which use no more than 3 litres of fuel per 100 km: DM1000 tax exemption until 2003.

A similar tax system for heavy goods vehicles has been in operation in Germany since 1994. (*From T&E Bulletin*, June 1996, *European Federation for Transport and Environment*)

INDOOR AIR QUALITY

Two reports published at the end of May identify the most common indoor air pollutants, the concentrations likely to occur in typical homes and potential health effects.

Indoor Air Quality in Homes: the Building Research Establishment Indoor Environment Study (Parts 1 and 2)⁽¹⁾ measured concentrations of nitrogen dioxide, formaldehyde, VOCs, bacteria and fungi in 174 homes in the County of Avon. The main findings were:

- formaldehyde levels are predominantly influenced by the age of the house;
- VOC levels are dominated by painting and decorating;
- nitrogen dioxide levels are significantly affected by outdoor levels (and therefore the season and extent to which the area is built up), gas cooking and the size of the household;
- mite numbers are strongly influenced by season, being the highest in summer and autumn; and
- bacteria and fungi levels are also influenced by season, being the highest in summer.

The implications of the study for the health of occupants has been assessed by the Institute for Environment and Health and published in *IEH Assessment on Indoor Air Quality in the Home: Nitrogen Dioxide, Formaldehyde, Volatile Organic Compounds, House Dust Mites, Fungi and Bacteria*⁽²⁾. This report recognises that the risks to health from dust mites and nitrogen dioxide are not known but nonetheless recommends a reduction in exposure; it also concludes that while the other pollutants studied may be hazardous, there is no evidence to suggest that current levels in UK homes pose a risk to health. It is however recommended that it would be prudent to reduce levels of indoor pollutants.

The report also identifies a number of important areas for future research, including:

- evaluation of potential health benefits of reducing levels of dust mites;
 - establish clearly whether or not high levels of nitrogen dioxide cause measurable health effects, particularly in vulnerable groups;
 - improve and standardise techniques for measuring other pollutants;
 - further investigate exposure to formaldehyde and VOCs.
1. Available from CRC Ltd, 151 Rosebery Avenue, London EC1R 4QX, price £30 for Part 1 and £35 for Part 2, plus p&p.
 2. Executive summary available from Medical Research Council Press Office, Tel: 0171 636 5422, ext 6011. Full report, price £30, available from Institute for Environment and Health, University of Leicester, PO Box 138, Lancaster Road, Leicester, LE1 9HN.

NATIONAL AIR QUALITY ARCHIVE

AEA Technology's National Environmental Technology Centre (NETCEN) is establishing an air quality archive to meet the growing need for access to air quality information from the public, researchers, local authorities and government.

The archive will contain data from the national network of automatic monitoring sites back to 1972; this includes information on ozone, nitrogen dioxide, particles and 25 hydrocarbons. The archive will also contain air quality statistics and trends in the data, site information and network maps, as well as information from the National Atmospheric Emissions Inventory.

Local authorities will soon have a duty to periodically review and assess local air quality against prescribed standards and objectives; it is hoped the archive will assist them as at present air quality data is held on a number of databases and it can be difficult and time consuming to gain access to all the information needed.

The archive is to be made available via the Internet and on CD ROM. For further details contact Sasha Middleton at AEA Technology, Tel: 01235 43 3345.

HEALTH OF THE NATION

NSCA welcomed the announcement in July that the Government is to consult on targets for air quality and noise as part of its *Health of the Nation* strategy. The Department of Health has also announced that it is commission research worth £2.5 million to address the effects of air pollutants on health. (The *Health of the Nation* is a long-term strategy, set out in a White Paper published in July 1992, to achieve a continuing improvement in the general health of the population of England.)

Europe's first ever national environmental health action plan (UK NEHAP) was also published in July. It is part of a WHO initiative to improve environmental health and will be used by the WHO as a model for other countries. The plan identifies over 150 actions to improve environmental health in the UK, with chapters on

- the institutional framework;
- environmental health management tools;
- environmental hazards, including water and air pollution, food contamination, solid waste and soil pollution, radiation, natural disasters and nuclear accidents, and noise;
- living and working environments;
- economic sectors; and
- international action.

Each chapter covers objectives (as stated in the Environment and Health Action Plan for Europe); basis for action (i.e. situation report on the national position); and actions: basic environmental health requirements; prevention and control of medium- and long-term environmental health hazards; and promotion of well-being and mental health. Progress on these actions will be reported annually in *This Common Inheritance*.

The UK NEHAP is published by HMSO, price £14. A short overview is available (quote code 96DPL005) from DOE Publications Dispatch Centre, Tel: 0181 691 9191.

THE ENVIRONMENT AGENCY - LOCAL AUTHORITY PARTNERSHIP

Tuesday, 22 November, Guy's Hospital, London

Keynote Speaker: Ed Gallagher, Chief Executive, Environment Agency

One day seminar hosted by

SE Division NSCA

and

South East Institute of Public Health

Members £58; Non-members £73; Students £15 (+VAT)

Details: Nicole Murray, SEIPH, Tel: 01892 515153; Fax: 01892 516344.

Joe Beagle (NSCA SE Division), Tel: 0181 452 0203.

MEMBERS' NEWS

Calling all NSCA Members! Are we receiving you? If you would like news of your organisation's environmental initiatives to be reported in *Clean Air*, please check that we are on your PR department's mailing list.

On 25 June the **Scottish Division** ran a very successful seminar on the twin subjects of Producer Responsibility and the Landfill Tax. The event, held at the University of Stirling, attracted considerable interest with speakers from HM Customs and Excise, Scottish Environmental Protection Agency, Morton Fraser Milligan WS, local authorities and EAG Ltd.

The next seminar will be held in Glasgow on 12 November, on the practical application of the new local air quality management provisions contained in the *Environment Act 1995*, together with various transport related issues. NSCA members, and non-members from all Divisions are most welcome to attend. Further details from Tom McDonald, Honorary Secretary, or Mrs Clare Carruthers on 0141 227 5552.

The Executive Committee of the Scottish Division continues to flourish, with arrangements for NSCA's 1997 Annual Conference, which is to be held in Glasgow, remaining high on the agenda. Recommendations have been made to the Brighton Head Office to ensure that the 1997 Conference is, from both a technical and social aspect, in keeping with the high standards set in previous years but with a hint of Scottishness!! Members with a 1997 diary may want to mark the dates now: 20-23 October.

F. John Smith is the new Chairman of the **South East Division**, taking over from Paul Cooney who is Chairman elect of the NSCA National Council. The Division's next seminar has been organised in conjunction with the **South East Institute for Public Health** and is entitled *The Environment Agency - Partnership with Local Authorities*. It will be held at Guys Hospital, London on 22 November. The Agency's Chief Executive Ed Gallagher is keynote speaker. Details from Nicole Murray at SEIPH 01892 515153, or Divisional Secretary Joe Beagle on 0181 452 0203.

The **Eastern and East Midlands Division** AGM was held at Ratcliffe power station. Over 70 members and guests toured the station and enjoyed a presentation from **PowerGen** on flue gas desulphurisation and environmental considerations in power generation. Past Chairman Joe Storer (below) was awarded a Certificate of Commendation on his retirement from **South Derbyshire DC**. Ken Williams MBE of **Gedling BC** succeeds to the Chair of the Division; David Romaine of **Derby CC** was elected Vice Chairman.



Diary dates for Eastern and East Midlands meetings: 19 September, 17 October, 21 November and 27 February 1997. Leicester is the venue for the September meeting, which will feature visits to the Eco House and Waste Recovery Facility; plus presentations on the **Leicester** and **Peterborough** Environment City projects. The November meeting will be held at **British Gas** Research Station in Loughborough, with presentations by BG on gas-powered vehicles, and an update from **Ford** on petrol and diesel technology. **Rushcliffe BC** hosts the February meeting, with a theme of "*The Environment Agency - a Year on*".

The **Northern Ireland Division** is looking forward to a visit from NSCA President Dame Barbara Clayton, who will be giving a lecture entitled *Environmental Pollution and Health - Principles for Policymakers* on Thursday afternoon, 5 December 1996 at the University of Ulster, Jordanstown, Belfast. Full details will be circulated in due course.

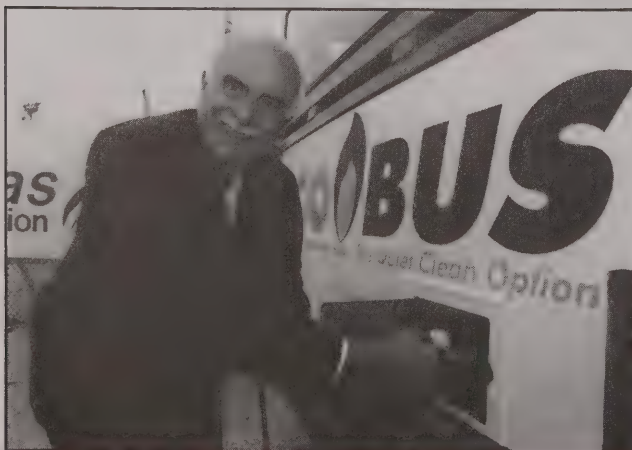
More news of NSCA members being appointed to Environment Agency Regional Environmental Protection Advisory Committees: **Dr Claire Holman** has joined the South West REPAC, whilst **Cllr Jack Carr** and **Frank Price** will both be serving on the North East REPAC.

Over 100 delegates attended the NSCA seminar *Traffic Management and Air Quality* to discover that this is a field where research is still in its infancy. The DOT's Jonathon Edwards reviewed the options available to local authorities, but acknowledged that predicting the air quality impacts of some traffic management schemes was tricky. In some cases traffic calming can make air pollution and noise worse. DOT have produced an extremely useful leaflet (4/96 - *Traffic Management and Emissions*) which summarises current knowledge. It's available free from the Traffic Advisory Unit on 0171 271 5169.

Shell UK is bringing a new competitive approach to BPEO assessment. It has announced a list of 21 contractors who will be competing to develop the best practicable environmental option for the disposal of the Brent Spar oil storage facility. Acknowledging that Shell had not done enough to explain its original plans for deep water disposal, Hans Rothermund of Shell Expro outlined a new dialogue process to help the company identify a solution which takes account of a wide range of views and concerns. "We want to engage, not enrage" he said.

Some novel environmental benefits are expected from three gas-powered buses being used in a European Union LIFE-funded project. The Accessible Sustainable Transport Integration project for elderly and disabled residents in North Camden aims to demonstrate practical ways of running accessible local transport fleets with minimal environmental impact. The **Ford** Iveco buses have been developed in conjunction with **British Gas NGV**. Not only are the buses powered by CNG, they are also linked to a satellite tracking system which optimises routes and cuts out 'dead mileage' - mileage covered unnecessarily by more than one vehicle.

Continuing our series of photo-opportunities for politicians with NGVs, we feature Shadow Transport Minister Glenda Jackson, viewing one of the buses in question, plus Environment Minister Earl Ferrers filling up a **Southampton** Citybus at the first British Gas "Gas Station".

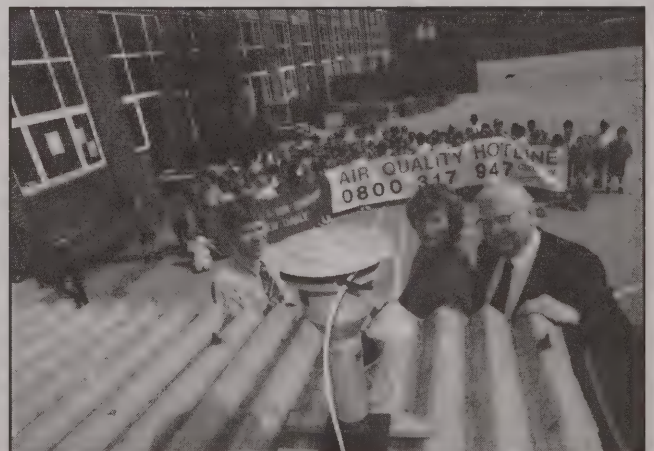


Why don't children walk to school anymore? Fears about road safety and air quality lead parents to drive their kids to school, producing further congestion and pollution. The London Boroughs of **Kingston, Sutton and Richmond** are combining to promote a Walking to School Campaign. Schools throughout the three boroughs will be reminding parents about the advantages of walking children to school, whilst children will be taught about how it is good for the environment and their health. Perhaps they will be reminded that pollution levels are often higher *inside* a car than outside.

Why don't children cycle to school anymore? They might be encouraged by a cycle commuter promotion campaign launched by **Sefton** Council which involves a virtual reality 'Cyber Cycle'. Users sit on a bike wearing an 'immersive' headset and are able to cycle round a virtual world. The project is funded by DOT. According to Bryan Lipscombe of Sefton MBC, "Our aim is to increase the number of people cycling to work in Sefton, whilst raising general awareness about the benefits of cycling. Virtual reality enables us to bring a safe but fun cycling experience into workplace canteens and staffrooms around the Borough". Watch out for people in funny helmets cycling round a canteen near you.

Coventry City Council is the latest authority to install a DOE-approved Automatic Urban Network air quality monitoring station. The station will be sited at the Bablake Weather Station, allowing meteorological data to be compared with the air quality readings. It will also assist work on the validation of the West Midlands emissions inventory, currently under way as part of the First Phase implementation of local air quality management.

Meanwhile **Croydon** Council has opened its second continuous air quality monitoring station at a background site based in a local school. Data on ozone and PM₁₀ will be fed into the Council's own Air Quality Hotline, and to the London Air Quality Network. Cllrs Maggie Mansell and Wally Grant are shown below with AQ specialist Ian Smith.



Cambridge City Council and Cambridgeshire County Council are the first local authorities in the UK to acquire

the ADMS-Urban air quality management system developed by CERC. ADMS was developed with support from industry and HMIP, and has also been selected by the **South East Institute for Public Health** to form part of the toolkit of software applications for air quality management in London.

A typesetting glitch in our last edition made David Romaine's arithmetical air pollution conundrum more puzzling than it should have been. The equations should have read:

$1 + 1 = \frac{1}{2}$ (if you share a car)

$1 + 40 = \frac{1}{2}$ (if you use the bus)

$1 = 0$ (if you walk or cycle)

Now you can work it out!

NSCA bids a fond farewell to **Robert Waller** who represented the Department of Health on our Technical Committee, and has been an advisor to the Society for longer than anyone can remember. Robert's first contact with NSCA was in 1950, when he presented a paper entitled *Current Research on the Possible Effects of Smoke upon the Incidence of Diseases of the Lung* to the annual conference in Margate. He was a leading researcher into air pollution and health, and until recently was still cycling into DH as a part-time advisor. We shall miss his wise advice, and wish him a very happy retirement.

Elsewhere...

Fears that the new **Environment Agency** would be dominated by water interests may have led to the name change for its Bristol headquarters - from "Rivers House" to "Rio House". Presumably this is to commemorate the 1992 Rio Conference as a landmark in sustainable development. The fact that "Rio" is also the Spanish word for "River" is surely coincidental.

Environmental scientist **Bruce Ames** poses an interesting dilemma in a recent interview with *The Independent*: "One of the gases in car exhausts is helpful in giving men erections...it is also very, very mildly carcinogenic..." Fortunately he doesn't name the pollutant concerned, otherwise some entrepreneur would doubtless start bottling it.

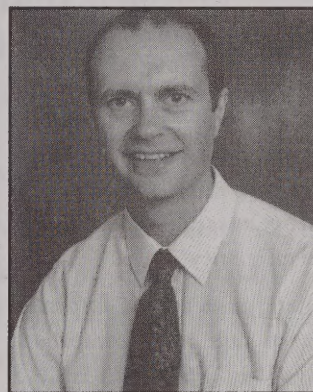
On a similarly sensitive subject, delegates to the NSCA/BRS seminar on alternative fuels in July heard **Brian Roden** of the **Electric Vehicles Association** describe the resistance of some drivers to electric vehicles. They had been told that exposure to electromagnetic fields could affect their sperm count. Reassurance was at hand: the drivers were reminded that by far the most common electric vehicle in the UK is the milk float. The legendary fertility of milkmen has not been called into question.

The final stages of the **Noise Bill** provided MPs with an opportunity for yet more anecdotes. **Dennis Skinner** revealed how he resolved a neighbour dispute over a cockerel which crowed at 5am every morning: "I could

have invoked the powers of the local authority's environmental health officer, but instead I had a novel idea. I offered to buy the cockerel and give it to the old-age pensioners for their Christmas dinner". Will this become a recommended practice in the forthcoming CIEH management guidance on noise? Alternatively, the new Noise Act would appear to offer a local authority the option of confiscating the cockerel and selling it, although this approach would, as they say, have to be tested in the courts.

Reorganisation of the NSCA library caused us to dust off some of the Society's archives, including the proceedings of our **first national conference** in 1905. One of the papers is touchingly entitled "*A Plea for a Systematic Comparative Analysis of the Air in Towns and a Consolidation of the Law Dealing with Smoke Emissions*". Which is just what the **National Air Quality Strategy** promises to deliver by the year 2005 - exactly one hundred years later. The paper's author, Sir John Primrose, may have had a shorter timescale in mind.

NSCA Staff



In July **Dr Malcolm Eames** joined the Society's Head Office staff, from the Public Affairs Department of The Body Shop International, to take up the newly created post of **Policy Officer**. Working with the Secretary General, Malcolm will be responsible for policy development, responses to

Government consultations, campaigns, press and political liaison and the provision of secretariat support to the Technical, Noise and Parliamentary and Local Government Committees.

An environmental science graduate, Malcolm wrote his doctorate on UK Government Food R&D Policy at the Science Policy Research Unit (SPRU), University of Sussex. Malcolm has considerable experience of working within the NGO sector. A former Director and Head of Information & Research for the British Union for the Abolition of Vivisection, Malcolm is presently also a member of the board of The Genetics Forum.

Malcolm takes over much of the work formerly undertaken by **Tim Brown**. Tim has become the Society's **Development Officer**, with responsibility for improving services to members, recruitment and fundraising, supporting Divisional Secretaries, and developing projects and events.

BOOKS & REPORTS

The Green Management Gurus. *M. Woodhouse, Eco-Innovations Publishing, 1996. £9.50.*

The first e-book to reach the NSCA library presents a series of interviews with sixteen leading thinkers in sustainable business. It is an interesting read for business managers or academics looking into the issues of sustainability, economics and the environment. The book is easy to install and read and well presented. A summary contents page would be helpful, but the keyword search function makes the format an effective research tool.

EMAS: A Catalyst for Change. *Produced by the Department of Environment; drafted by David Brown, Consultant to NSCA. 1996.*

The European Community's 1993 Regulation "Voluntary Participation by Companies in the Industry Sector in a Community Eco-Management and Audit Scheme" (EMAS) aims to encourage continual evaluation and improvement of environmental performance. Good environmental management not only helps improve the environment but can also motivate business by providing a recognised system that improves competitiveness through reduced waste, lower costs and increased efficiency.

This booklet aims to stimulate positive and informed debate about EMAS and thus encourage more companies, and indeed local authorities to apply for EMAS registration. Two case studies - one industrial, one local authority - outline their respective approaches to EMAS registration.

Blueprint 5: The True Costs of Road Transport. *D. Maddison, D. Pearce et al, Earthscan, 1996. £10.95, ISBN 1853832685.*

Using the theoretical tools of environmental economics, the authors present a cogent analysis of why in their words "almost everything has gone wrong" with the UK transport sector. Drawing upon a host of recent studies, from economics to epidemiology, this book provides a detailed estimate of the total external costs of UK road transport (£45.9-52.9 bn marginal external cost for 1993 alone). Having clearly identified the problem, as they see it, the authors forcefully argue that only a set of market-based solutions will provide the least cost route to a sustainable transport system.

Dictionary of Environmental Science and Technology, second edition. *A. Porteus, John Wiley, 1996. £12.99 ISBN 0471960756.*

A second, and greatly expanded edition of this useful reference book. More than just a dictionary, it contains an

esoteric mixture of definitions of words and lengthy explanations of scientific, technical, economic and legislative terms. For example the definition of 'Environmental Impact Assessment' covers ten pages, complete with examples and diagrams. In contrast 'EU Legislation' merits only a twelve line attempt at describing the complex legislative process. Inconsistencies aside however, it is excellent value and covers a wide range of disciplines. Appendixes cover listings of organisations, a table of chemical elements and SI units.

A Moment on Earth. *G. Easterbrook, Penguin, 1996. £9.99. ISBN 0140154515.*

This book adopts a long term perspective in looking at the environment from the point of view of nature. In contrast to much ecological thinking, Easterbrook puts forward his belief that people, technology and the natural world can work together for mutual benefit. He points out that pollution is in decline and takes a positive view of current trends in international negotiations on the environment, pollution control and conservation.

Sustainability, the Environment and Urbanisation. *Ed Cedric Pugh, Earthscan, 1996. £16.95. ISBN 1853833576.*

With contributions from leading experts in the field of the urban environment, the book focuses on the issues of poor sanitation, water quality, air pollution and housing. It uses case studies and examples from Third World countries, looking at the economic context of these problems and assessing environmental appraisal methods.

Integrated Pollution Control. *P. Castle, H. Harrison, Cameron May, 1996. £65.00. ISBN 1874698805.*

The book describes the current regulatory and administrative framework of IPC. While assessing the situation at September 1995, it acknowledges the establishment of the Environment Agency, expecting changes to be in internal management rather than affecting the IPC system. It looks at enforcement, administration, the relationship between IPC and other systems and developments under the forthcoming EC Directive on Integrated Pollution Prevention and Control.

FORTHCOMING NSCA EVENTS

Monday 21 - Thursday 24 October
Brighton

Environmental Protection 96
NSCA's 63rd Annual Conference

Tuesday 12 November

Seminar - Glasgow

Local Air Quality Management
Scottish Division

Friday 22 November

Seminar - Guy's Hospital, London

The Environment Agency
- Partnership with Local Authorities
SE Division, NSCA & South East Institute of Public Health

Tuesday 26 November

Training Seminar - NEC, Birmingham

Making Waste Work for You
- Developing BPEO for Waste Disposal
NSCA in association with
Institute of Wastes Management &
Environmental Services Association

Tuesday 11 February 1997

Training Seminar

NEC, Birmingham

Tuesday 15 and Wednesday 16 April 1997

NSCA's Annual Spring Workshop
Abingdon, Oxfordshire

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